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ABSTRACT

The essay describes the origin and functioning of the largest scientific library in Europe, the National Lending Library for Science and Technology in Britain, (NLL). This Library lends almost entirely by mail, at a rate approaching one million items per year. After outlining the origins of the NLL in government circles shortly after World War II, it attempts to present the picture of its operations today under the following heads: Coverage and Acquisition; Principles of Storage; Records; Techniques of Postal Lending; Personnel Structure; The Reading Room; Russian Translating Program; The Educational Campaign. Some prospects for the future are surveyed in the conclusion. Throughout the essay, emphasis is laid on the innovative approach of the library's first Director, Dr. D. J. Urquhart, and the successes his techniques have had in coping with the national problem of disseminating scientific information in Britain. A bibliography is included. (Author/SJ)

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GREAT BRITAIN'S NATIONAL LENDING LIBRARY

By

Peter G. Watson

FILMED FROM BEST AVAILABLE COPY

Los Angeles
University of California
School of Library Service
1970

LI 003 688

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Peter G. Watson December, 1969.

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ABSTRACT

The essay describes the origin and functioning of the largest scientific library in Europe, the National Lending Library for Science and Technology in Britain; this library lends almost entirely by mail, at a rate approaching one million items per year. After outlining the origins of the NLL in government circles shortly after World War II, it attempts to present the picture of its operations today under the following heads: Coverage and Acquisition; Principles of Storage; Records; Techniques of Postal Lending; Personnel Structure; The Reading Room; Russian Translating Program; The Educational Campaign. Some prospects for the future are surveyed in the Conclusion. Throughout the essay, emphasis is laid on the innovative approach of the library's first Director, Dr. D. J. Urquhart, and the successes his techniques have had in coping with the national problem of disseminating scientific information in Britain. With a Bibliography.

(Author)

I

Introduction

In this essay I wish to consider Britain's National Lending Library for Science and Technology (hereinafter NLL). This is undoubtedly the major postwar development in the librarianship of science in Europe, and may, indeed, prove to be the outstanding practical advance in the operation of large special libraries in the decade 1955-65. Naturally, we do not imply that it has eclipsed the other manifestations of a remarkable period of progress; for example, the many fine libraries being created for Britain's new generation of universities (Sussex, Essex, Kent, Lancaster, York, Salford, Southampton, Strathclyde, Bath, Brunel and others) are embodiments of much recent thinking on such matters as library architecture and design, stock arrangement, service to undergraduates, decentralization, periodical administration, etc. But theirs is essentially the task of refining and brightening and humanising the existing modes of library operation. The NLL can claim to be radically different, as the journalist representing the magazine Nature at the opening day ceremonies could witness:*

> Dr. Urquhart was able on this opening day to show an operating establishment which in planning and equipment makes full use of the remarkable advances in scientific technique in this field during the past two decades. He has had the courage to break imaginatively with many current library techniques and practices, and although it is as reasonable to wait for experience to attest the soundness of his judgment at all points as it would be unreasonable to expect a new venture to be entirely free from teething troubles, it was clear to all that here was something unique in Great Britain.

That the NLL is not just a good modern library but in fact a new type of library, the work of a fresh and innovative mind, may be seen from the following statements, which taken together cannot be claimed for any other large library in the world:

1. The NLL has no catalog of its stock.
2. As a matter of routine, each day's new acquisitions and returned loans are on shelf and available for loan the very next day.
3. More money is regularly spent on the purchase of literature than on operating the library.
4. The unit cost of issues at the NLL is not only less than that of other libraries, it is falling.

All this is true of the library which, it has been estimated,** now

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*Editorial in Nature 196 #4859, 15 Dec. 1962, pp. 1019-20.

**"Survey of inter-library lending in eight local areas" by D.W.G. Clements. Journal of Librarianship 1 (2) April 1969, pp. 107-18.

supplies over 55% of all inter-library loan requests in the country, and which is the largest scientific library in Europe.

If these are some of its innovations, however, we must emphasise that the NLL is designed to work predominantly with traditional printed materials on traditional library shelves, at least for the next century or so, for which the projected volume of holdings is 12-18 million items.* The NLL is fairly and squarely a library, not some kind of restricted and specialised information center. Microrecords are a small but significant portion of the whole, and the library is continually expanding its capacity to deploy that collection (which is the largest stock of scientific literature on microfilm in the U.K.), as well as continually looking for other ways to exploit mechanization generally--for example by maximising automatic control of clerical tasks, and installing various types of book-moving machinery. In other words, whilst acting as a testing ground for new concepts of library operation, and in many respects doing pioneer work in the collection and dissemination of scientific literature, it has simultaneously been serving (and serving, as we shall see, with conspicuous success) the urgent needs of the present.

A brief but authoritative account of the principal factors bearing upon its creation has been given by the NLL's first Director, Dr. D. J. Urquhart, in "Some Ideas behind the NLL", a lecture delivered before the International Summer School of Librarianship held in Britain in 1966, under the auspices of the British Council.** Since Dr. Urquhart is the founding father of the NLL, his numerous papers on the planning and execution of the whole enterprise (mainly in Journal of Documentation) are the necessary first reading for anyone seeking to understand the significance of "the largest British library which has been created in the last 50 years".*** Their general tone of vigorous iconoclasm may be applauded or not, according to one's priorities, but the magnitude of Urquhart's accomplishment makes his voice a powerful one. In campaigning for, and eventually directing the establishment of, a great national library to serve modern science and technology, his perception of national needs in scientific information was so accurate, and his plans for their solution so soundly conceived, that today, only seven years after its opening, the NLL receives close to 17,000 requests per week (the 1968 total was 769,000); satisfies about 86% of them forthwith, and it might almost be said that British science could not survive without it. And it is pleasing to record that in 1969, with the growing

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*"A National Lending Library for Science and Technology" by D. J. Urquhart. Journal of Documentation 13 (1) March 1957, pp. 13-31.

**Published as chapter 9 of Librarianship in Britain Today, W. L. Saunders, ed. London, The Library Association, 1967.

***"Some Ideas behind the NLL"--page one of a mimeographed typescript which I have used throughout.

public appreciation of the true significance of what he has created, national recognition has begun to come to Dr. Urquhart; on the professional side, he has been appointed F.L.A., and on the governmental, he was designated C.B.E.

From Conception to Construction

The NLL has its origins in government, rather than in librarianship or even purely in science, because, as is usual in modern industrialised societies, "Science" has become a foremost national concern, with the state alone able to coordinate and finance it according to the national goals. To the various governmental and public bodies concerned with civilian science in Britain in the aftermath of World War II, the way ahead looked fraught with uncertainty and hazard. On the one hand, the exertions of global warfare, having depressed much of her sprawling peacetime scientific and industrial activity, had sent other sections--radio technology, shipbuilding, explosives, and the like--into forced acceleration, and had actually left the country in possession of an inherently greater capacity for scientific and technological productiveness than it would otherwise have had; one thinks, for example, of the development of the jet aircraft. On the other hand, there were immediate and towering obstacles, physical, political and psychological, before this potential could be realised. Whilst not totally reduced to a smoking rubble like much of Europe, Britain was just as psychically exhausted and just as devoid of any clear pointers to the new era. On the world scene an incredible tangle of economic and political questions now waited in the wings; at home, there were horrendous problems of basic human social existence, such as food supplies, housing, fuel and power, public health, manpower, transportation, education. Neither of these larger themes need be developed here, but the study of libraries is a social science, and therefore the presence of these factors as part of the overall social climate from which the NLL emerged should not be underestimated.

To look at the nation's science and technology within that context is to see these difficulties faithfully mirrored. There was an acute shortage of trained scientists and technologists, and the educational processes for producing them--especially technologists--needed a radical rethinking and redesigning that would in fact take the next fifteen years or so to accomplish. There was the inexorable prospect of a dwindling supply of raw materials--minerals and industrial metals, for instance. The generations of almost thoughtless abundance at the expense of an Empire that covered half the earth were over. Technologically, the country was staggering under a top weight of heavy industry balanced on a too narrow economic base, and urgently needed a redistribution of its research effort. Continuously since 1939, war and war-related research had preempted that effort, and the scientist who survived to become a civilian again had now to cast his mind back to what he had been doing six or seven years ago, recollecting his scientific priorities, his research aims, and in some cases even his experimental methods. Needless to say, laboratory space was scarce, and sophisticated equipment frequently scarcer. One of the most serious failings, one common to all elements in this generally precarious situation, was the blockage in the

flow of vital scientific and technical information. Without a solution for that, no remedies for the other grave ailments would be worth anything.

That the need for efficient transmission of information was indeed a problem of a different dimension has been shown by the rise of information science as a new and separate scholarly discipline over the last 25 years: that there was a genuine danger of a widespread information breakdown at this time was amply demonstrated by movements in the scientific community itself. After the war the Royal Society had convened an Empire Scientific Conference (1946) to take stock of the present situation and future direction of science as a whole; it judged the information question to be sufficiently complex and sufficiently critical that the Royal Society might make it the subject of a separate conference. Shortly thereafter a government sponsored meeting, the British Commonwealth Scientific Official Conference, endorsed that proposal, and the Royal Society accordingly obliged by holding the now famous Royal Society Scientific Information Conference of 1948. It was essentially an opportunity for practising scientists to state collectively their views and their requirements, and it was also attended by several experts in documentation and library service for the sciences, among them Urquhart. From this two-week gathering of top talent, excellently organized to focus straight onto the problems, came a series of recommendations and ideas and principles stretching across the whole panorama of the scientific information scene, including a challenge to the government to recognise the logic of having central collections large enough to ensure that every publication of value to science and technology would be readily available.

The existing library machinery was breaking down for several reasons. The British Museum Library, although it had long had the right of legal deposit of British publications, was inflexibly a non-lending institution, and was in any case basically oriented to the humanities, as the studies done for the Dainton Committee were to confirm anew.* In a national perspective, the same could be said of the other two copyright libraries, the Bodleian at Oxford and the University Library at Cambridge. But mere accessibility of copyright material from a national center would not have answered the problem, because (first) most of modern British publishing was available already in the regions, and (second) the substantial need was for access to foreign scientific material, especially that from outside the English-speaking world.

For the scientific community there was the library of the Patent Office, and the library of the Science Museum, the names of both of which indicate their specialized origins. The former was purely a reference collection to support the functions of the Patent Office, but the latter, which had enjoyed a certain leadership in library work in the 1930's

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*Report of the National Libraries Committee. Cmnd. 4028, London, H.M.S.O., 1969.

under the direction of the renowned Dr. S. C. Bradford (1925-38), had spotted the trends and had tried to reorganize its holdings and its procedures accordingly. It had begun, that is, to concentrate urgently on the collecting of scientific periodicals and, in an admirably venturesome response to the rising pressure of demand for something better than rigid "in-building use", had started to loan out its stock through the mail to suitable institutions (government research stations, universities, industrial concerns, etc.). By 1956, when the SML possessed almost 10,000 serial titles, a photocopying service had also been initiated.

Unfortunately, however, the Science Museum Library, being a rare kind of asset, was also functioning as the library of London University's major scientific foundation, Imperial College, and this double role was placing an impossible burden on a staff which, after the chaos of the recent war, was depleted to about half the size it had been in the library's best years during the 1930's. It was a sad fact that in 1956 "the number of graduates in science on the staffs of the two main scientific libraries--the Science Museum Library and the Patent Office Library--is less than it was in 1938".*

A further drawback was the physical overcrowding: the Science Museum Library buildings had reached saturation, according to Urquhart, about 1940, and the library had existed since then on the expedient of remote storage. Now apart from the serial lending effort, which was rapidly growing big enough to overshadow all else that the library did, the bulk of SML stock consisted of older scientific monographs, stored there, by analogy with the literary treasures of the more famous Museum, as a permanent national archive. These of course were now rarely disturbed from their serried slumbers--the scientists' most pressing need is for the latest literature--making the Science Museum Library as a whole, considering the enormous land values in central London, a very expensive warehouse. For such reasons as these, the best service that SML could offer was hopelessly inadequate to the national situation, and no other institution was even doing a quarter as much.

The government was not unaware of the problem. It had realized that "Science" would be something quite different after World War II than it had been before it, and as soon as possible after the end of hostilities, had started to organize the nation's great ponderous swing back to civilian science. In January 1947 it formally established an Advisory Council on Scientific Policy whose first chairman, Sir Henry Tizard, doubled as chairman of the Defence Research Policy Committee, and was thus a most powerful figure in British science. This body was concerned with overall strategy; the agency responsible for actually managing the country's scientific effort in these bleak years was the Department of Scientific and Industrial Research. Created in 1915, D.S.I.R. had for many years been relatively small and obscure (compared, for example, to the splendors of the India Office) but the 1939-45 war had swept it into critical prominence. As the national administrator

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*"The Documentation Problem in the United Kingdom" by D. J. Urquhart. American Documentation, 7(4), Oct. 1956, pp. 276-82. A far-seeing discussion.

and coordinator of civilian science it was much concerned in the post-war period with restarting the flow of information, and indeed the Advisory Council in its first Annual Report had urged that "the information unit already functioning in the Intelligence Division of D.S.I.R. should be expanded so as to provide a national service of the type required."*

The official records show that this was set on foot immediately:** the Intelligence Division was upgraded and its tasks more comprehensively defined. Amongst other things, it was to maintain close contact between the Department's own research establishments on the one hand, and work being carried out elsewhere in the country on the other. It was to act as the coordinating center for the entire Department's publishing effort; and it was

> (to give) assistance to enquirers on problems concerning the organization of research, and . . . to encourage the fullest use of existing scientific knowledge by advising enquirers on the most suitable sources of technical information, thus bringing the man with the problem into direct touch with those most likely to be able to help in its solution. (loc. cit.)

Meanwhile, Tizard's Advisory Council had recognized the gravity of the information problem sufficiently to set up a special Working Party on Scientific Libraries, under the chairmanship of Mr. W. M. Nicholson, to examine the whole situation. In its initial findings, incorporated into the Advisory Council's Third Annual Report, we can pinpoint the first official formulation of the new direction that scientific librarianship in Britain was in fact to take: the Working Party found that

> while the money expended on research had greatly increased, the funds, accommodation and staff available to the scientific and technical libraries had, in general, remained static, and these libraries were no longer capable of maintaining full collections of technical literature, and of providing reasonable facilities for readers. Industrial and other users were therefore badly handicapped . . . (The Working Party) recommended that, in order to secure effective and coordinated action, a Scientific and Technical Library Authority should be set up as a semi-independent agency of the Government to run central loan and reference libraries. Its first duty would be to develop a central reference library in London, if possible in close association with specialised libraries of the learned societies, and to develop a national lending library of science and technology, not necessarily in London.***

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* Advisory Council on Scientific Policy, First Annual Report, 1947-48. Cmd. 7465, London, H.M.S.O., 1948. p. 10.

** Dept. of Scientific and Industrial Research, Thirty-third Annual Report, 1947-48. Cmd. 7761, London, H.M.S.O., 1948. p. 22.

*** Advisory Council on Scientific Policy, Third Annual Report, 1949-50. Cmd. 7992, London, H.M.S.O., 1950. p. 13.

Lest anyone failed to grasp the absolutely crucial position that scientific and technical information must hold in the new post-war, post-colonial era, Tizard set it starkly in the context of the nation's whole political and economic life:

> Impoverished by a costly war, and with diminishing natural resources, our solvency depends . . . on our power to purchase the necessities of life by selling our manufactured goods* or technical services abroad. (op. cit. p. 16)

In this policy recommendation, which at this stage constituted little more than an item for discussion in senior government circles, can be seen a broad design for constructing a rational system of scientific information control based upon what was there--the Patent Office Library and the lending techniques of the Science Museum Library, the finished network to come under the aegis of a "semi-independent" public authority. All this was needed as a matter of urgency. At this point, before narrowing our gaze to the lending aspect which forms the subject of this essay, we may note that it was another 17 years before the National Reference Library for Science and Invention became a reality, and that the question of a National Library Authority is still being discussed after 20 years; the creation of a loan collection was, by contrast, accomplished in the rather fast time of 12 years--but here the circumstances were especially favorable.

If, then, we resume the main story as the D.S.I.R. Intelligence Division had been newly strengthened and invigorated, we see it launching a variety of initiatives designed to give specific help with information problems to practising scientists, particularly those in medium and small companies. It was acting as an information referral center, a service which soon attracted "hundreds of thousands of questions each year",** so critically did the demand for scientific information outweigh the known sources of supply. The technique was to direct the questions to an appropriate organization, using where suitable the information resources of one of the government research stations, of which the Department had charge. When this failed, the problems were further publicized through a small, informal bulletin called Unanswered Questions, whose purpose was "to attempt to discover the answers to specific scientific and technical questions when normal sources of information have apparently failed" (from the statement at the head of each issue). Demand for this immediately exceeded 2,000 copies, and a success factor of over 50% was achieved on what was undoubtedly a set of unusually stubborn reference questions. It is mentioned here to point up the deplorable state of the national scientific information flow when a regular mimeographed list of open questions had to be sent out by an Intelligence unit of the government and could be so plainly in general demand, not only by these who had submitted a question, but by many others in the scientific community interested in how to find the answers (which were printed if found) to this

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*The text has "manufactured foods" but the immediate context leaves no doubt that this is a typographical error.

**D. J. Urquhart, letter to author, April 1969.

type of complex query.

As a small but well-chosen contribution towards alleviating the famine of foreign scientific information, the Department was also issuing in serial form Translated Contents Lists of Russian Periodicals. The impact on British scientists, many of them seeing for the first time the significance of the contents of Russian journals, was predictable--they wanted translations of the articles. These too the D.S.I.R. tried to arrange.

A related innovation was a lending service, the logical next step in the effort to stimulate awareness and use of scientific and technical information. The Advisory Council on Scientific Policy had viewed this component in the D.S.I.R.'s information program as so exigent that throughout the mid-1950's it had had its working party continue discussion and development of that original conception laid down in 1950. The working party, incidentally, had found that another high level government advisory body, the Committee on Industrial Productivity, also formed in 1947, had created its own standing sub-group of information specialists, this one called the Panel on Technical Information Services. By 1949 the two had merged under the Advisory Council on Scientific Policy, whilst maintaining, true to the inscrutable ways of state bureaucracy, the name belonging to the other group: Panel on Technical Information Services. In 1954 the Advisory Council, increasingly convinced of the correctness of the lending library idea and increasingly worried by the government's apparent failure to appreciate the urgency of the situation, stated the case again, this time incorporating into its report a clear and detailed policy recommendation from its Panel:*

1. There is a need for a national science lending library which cannot be met either by a national science reference library in London, or by the development of any existing library on its present site. (i.e. the Science Museum Library--Author)

2. In the interests of security the new library should be outside London, preferably in a place easily accessible to the industrial areas of the North and Midlands, for which it could, to a limited extent, also serve as a science reference library.

3. Much of the material the new library would need could come from the existing collections in the Library of the Science Museum . . .

4. Responsibility for the new library should be vested in the D.S.I.R., since the work of the library would be complementary to that of the Department's Intelligence Division and the information services which it provides.

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*Advisory Council on Scientific Policy, Seventh Annual Report, 1953-54. Cmd 9260, London, H.M.S.O., 1955. p. 12.

5. The new library should be the centre of a regional loans system, based on selected municipal libraries which would be expected to stock and lend the 300 or so periodicals that are most used by scientists and engineers in industry.

Yet another year was lost, however, as objections were voiced to the building costs, inter alia, and the Council's next Annual Report shows a desire to bring matters to a head. The Council had, after all, been assembled by the government and asked for its expert advice on these high questions of national policy: how many times must it give the same advice? Emphasizing that its Panel had "repeatedly drawn attention to the failure of British scientific and technical library facilities to keep pace with developments"* the Council pushed for at least some preliminary action to be initiated. Of the twin pillars of the projected new information structure for science, the Reference Library in London was the further on towards realization, having been agreed in principle and the early planning begun. The future of the Lending Library away from London seemed to them to be still uncertain. The Advisory Council, perhaps for the record, then set forth again the much discussed alternatives--the clearinghouse concept, the regional cooperation concept, the proposal to base the new loan service on the major university and technical college libraries, etc.--and rejected all of them, concluding that:

> It is clear . . . that there is no practical alternative to establishing a full scale National Science Lending Library and we therefore wish to press that, at least, a start might be made in this direction. For example, if there has to be a delay in finding or building new premises, an early start should be made in creating a nucleus of the literature which will be required--especially current and recent numbers of scientific and technical periodicals, which will be much more difficult to procure later on--and of the staff who will have to be trained to run the library. (op. cit. p. 7)

This proved decisive, and one of the Department's leading documentalists, D. J. Urquhart, was told at the end of November 1956 that he could begin collecting. Urquhart, after gaining a doctorate in Metallurgy from the University of Sheffield (1934) and spending three or four years as a researcher in the big Yorkshire steel industry, had found his vocation in the library and information problems of modern science and technology. He took a position in the Science Museum Library and moved down to London in 1938, the last year of Bradford's directorship. After war service in the Admiralty and the Ministry of Supply he returned to the Science Museum Library; thus, when in early 1948 he switched from there to the D.S.I.R., he had had close practical contact with that unique postal lending operation, and had watched it produce results that were impossible by traditional methods. As an information officer with the government, his first big assignment had been to assist in the planning and organizing of the Royal Society's 1948 Conference, which he did with

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*Advisory Council on Scientific Policy, Eighth Annual Report, 1954-55, Cmd. 9537. London, H.M.S.O., 1956. p. 6.

vigour, arranging exhibits, conducting surveys, providing background papers, and, during the event itself, participating keenly in the discussions. When the published account of this memorable conference appeared, Urquhart's name in the Author Index carried more references than that of anyone else. He was also appointed a Joint Secretary of the Panel on Technical Information Services just before it was attached to the highest policy council on civilian science in the land, and his expert influence in and around D.S.I.R. in these years of discussion and committee work must have been weighty; probably, in the light of events, predominant.

He was appointed Director-designate of the future National Lending Library for Science and Technology, and from here on the story is largely the account of his personal involvement and accomplishment. The interest of the Advisory Council on Scientific Policy had been liquidated with the formal commitment of the government's permanent agency to the task of implementing its ideas, and the cause thereupon became essentially Urquhart's. He decided to call the operation the "D.S.I.R. Lending Library Unit" in order to describe accurately its position whilst preserving the full official title of "National Library" for the exciting prospect now clearly visible on the horizon. The collecting task was rapidly set moving on three fronts: first, in compliance with the recommendations of the Advisory Council, stock from the Science Museum Library (mainly periodicals) formed the core. By 1956, it will be recalled, SML was subscribing to about 10,000 current scientific serials; a study of projected user needs by Urquhart and his small staff now forewarned them that by just six years hence, the earliest date by which a fully equipped national service might be feasible, they would be facing double the input and output of SML as it stood in 1956.* Item two in the acquisitions program was therefore an urgent, global purchasing effort, whilst simultaneously an appeal for donations went out to the scientific and library world at large. Temporary quarters for all this hurriedly generated activity were found in Chester Terrace, an elegant row of Regency town-houses designed by Beau Nash.

At this stage, it was evident to all that formidable obstacles still lay ahead. The Lending Library Unit was a tangible beginning, but a complete national library had in effect now to be designed, built, stocked, staffed and brought into service. To this end, the Unit began its own series of surveys to gather vital usage data. The Intelligence Division, for its part, had made slow but discernible progress in unclogging the country's information pipelines. Everything might have been immeasurably protracted, however, had not the logic of events at this juncture given their earnest and worthy but still little-known labors a publicity agent's dream. All these efforts, tardy and tiny as they now appear, were undertaken on the conviction of the government's expert advisors that scientific and technical information was perhaps the prime commodity in a modern industrial state, and that Britain was not getting an adequate supply of it, particularly from overseas. The force of this was now suddenly and dramatically heralded to the whole society at once, when on 4 October 1957 the Soviet Union successfully launched the world's first artificial satellite.

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*"The Needs of the Humanities--an outside view" by D. J. Urquhart, J. Doc. 16 (3), Sept. 1960, p. 128.

This jolted the western world awake to the fact that a solid technological superiority had been quietly established by Russia, and that Soviet science (indeed the whole socio-technical accomplishment of that extraordinarily talented people) was alarmingly unknown to outsiders. This was already apparent to certain small groups of the scientific community, and it did not directly cause the NLL; as we have seen, a decision to begin amassing literature for a proposed national collection had been conveyed to Dr. Urquhart in the previous year (November, 1956) on the basis of the bureaucratic and bibliographic inadequacies outlined above. But it did spotlight the need for a concerted effort to collect all available Soviet scientific publications; one of the surveys just recently undertaken by the Lending Library Unit at this time showed that

> all the libraries in the country only contain about 49% of what is currently available, and the libraries which sometimes lend between them only hold 39%.*

Furthermore, it was immediately obvious that many scientists were denied intellectual access even to what Russian material there was in British libraries, because very few of them understood Russian, and translations were chronically scarce. This discreditable situation, suddenly revealed to the public at large by Sputnik I, has colored the entire subsequent development of Western science, and it gave a huge impetus to two pivotal arguments being urged by Urquhart and a few others. One was that a priority should be given to collecting Russian material, with an additional thrust to the work of translation; the other was that it should be the NLL's responsibility not just archivally to store a national collection of modern science, but actively to promote its use--to mount a well-organized, vigorous, permanent educational campaign in the use of scientific literature, far exceeding the brief, informal mimeographs and the isolated lectures to local Friends and schoolchildren, which represent the limits of what most libraries imagine they can achieve.

In these early days after the project had been given official blessing, when the precise role that the NLL could and should adopt was still a matter of speculation in a somewhat sceptical library world, Urquhart pressed his case in lectures, discussions, articles and letters, for the creation of a rapid direct-lending operation on an enormous scale; one that would expend the minimum necessary not the maximum possible, amount of time and money on basic record-keeping. The need was desperate, and nothing less would be worth their consideration. A prototype of a potentially spectacular new technique had been tested, and it would be myopic, he argued, to be so overawed by this magnificent idea of building a world collection of the literature of modern science and technology as to let it lead inexorably back to fearful and irrelevant obsessions with archives, preservation for posterity, and "reference only." His running critique of the British Museum mentality was particularly biting. Unless the stuff were used and promoted now--advertised and publicised to the scientific,

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*"Some Functions of the National Lending Library for Science and Technology" by D. J. Urquhart. Library Association Record, 59 pp. 203-06, June 1957. (N. B. Despite its title, this was written when only the name and some preliminary planning existed.)

industrial and library communities, rather than simply waiting for the borrower to "come to the library" - there would be no posterity capable of appreciating it; for how could anyone suppose that only the scientists of the distant future would need the researches of the 1960's, whilst the present generation somehow managed without them? This shows, as any scientist will confirm, an appalling misconception of what modern science is. Unlike the humanities, where it is routine for books to attain as the decades pass an enhanced fascination and importance (and price), scientific writing fails in its essential purpose if it does not within about 20 years generate the new research that will render it in substance obsolete. Usage curves are well known to fall steeply after about five years, to a uniformly negligible level about the twentieth year and thereafter. This is now a long accepted truth, but it was unusual enough in the 1950's. When, for example, the Advisory Council in its fourth Annual Report had discussed the London based Science Reference Library it had exclaimed:

> A novel feature of the library is that it is not proposed that it should contain any scientific literature more than about 50 years old.*

--that, approximately, was the moment of discovery in high-ranking government circles; it took the rest of the decade and longer for this fact to penetrate the thinking and influence the action of the great mass of librarians, educators and civil servants. Urquhart at this time had to urge it at every opportunity.

And in advocating to the library world a decisive swing from hoarding material for a privileged few, to disseminating it quickly and cheaply to a mass clientele, Urquhart was, of course, fighting his own professional version of the great historic struggle for public library service--for democratization, and against élitism; too often in modern Britain the élite are those who happen to live in London. It may, perhaps, sound surprising that he had to fight at all; but England, it should be remembered, is a society which has for centuries traditionally bestowed its most flattering rewards and recognition upon those with a broad education in the humanities. Furthermore, the distinctively 20th century concept of expert specialization has unquestionably been slow to gain a footing on the upper ledges of the administrative mountain: Urquhart was facing, even in the 1950's and 60's, a government, a civil service and, it must be added, a library profession, that were still markedly dominated by "arts generalists", if not any longer by mere cultured amateurs.

This is in no way to imply that the thrust of modern science and technology had totally bypassed the governmental structure and the library world. Obviously there have been radical changes, mainly, however, only since World War II. Nor is it to suggest that to investigate the past, and to treasure the physical legacy of the past, is less than utterly laudable; science too has its historians and its rare editions and its timeless classic statements. But it is to suggest some of the embedded

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*Advisory Council on Scientific Policy, Fourth Annual Report, 1950-51. Cmd. 8299. London, H.M.S.O., 1952. p. 10.

attitudes which, consciously or unconsciously, were preventing many very intelligent people from seeing what Urquhart, a scientist trying to help other scientists, saw with clarity--that a fine, valuable, indeed unique national collection need not thereby become yet another venerable but petrified reference institution. We alluded above to his "vigorous iconoclasm" and there is no question but that it was necessary to shake things up somewhat, to reach his essential goal of maximum availability for scientific literature.

He utilized a big battery of argumentative techniques--surveys; statistics; graphs and projections and other extrapolations; factual evidence of present shortcomings; repeated and spirited appeals for a slaughter of the sacred cows of library service; pleas for the adoption of rational procedures designed to answer the demonstrated needs of the borrowing community; and last but not least, his own almost unique position as scientist, library administrator and senior government officer--the urgent purpose in all of this being to compel a thorough public discussion while plans were still fluid. His analytical survey of the latest (i.e. 1952) edition of the World List of Scientific Periodicals, for example, revealed that

> 88% of the contents of the World List . . . available in the United Kingdom are available in London, but that 47% are available in London only.*

--if we assume that a respectable majority of titles in the total list was in fact available in the United Kingdom (Urquhart's estimate was an absolute maximum of 76%) then the first figure sounds creditably high: the sting comes in the second. The excessive bureaucratic centralism which was soon to become an issue of national politics is here apparent in a library context. Urquhart, who had come to London from Yorkshire, knew that the industrial and academic potential of entire geographic areas in the North of England and in Scotland was being neglected. The London libraries formed a distinct group which had a sacred trust, as it were, to "preserve for posterity" the written records of the culture. In the meantime, crosstown communication was a very simple matter, and they probably had access to everything of importance in the mainstream of Western science. Only one scientific library had made a serious effort to put its resources at the disposal of the country--the Science Museum Library, which had limitations that we have already discussed. The notion of setting up a national library anywhere but in London was, to many ears, a quaint idea: nevertheless, as this evidence indicated, it would at least be worth an unbiased investigation. Urquhart opposed absolutely the creation of another network of Regional Bureaux such as were (and are) used as intermediaries by the National Central Library for normal inter-library lending, noting that the typical pattern was a long delay followed by only moderate chances of any title found in a union catalogue being supplied. He has long maintained that the union catalogue approach should be avoided if at all possible; and when in 1964 a survey of the NCL's efficacy was made, he claimed that, beneath

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*"A Domesday Book of scientific periodicals" by D. J. Urquhart. J. Doc. 12 (2) June 1956, pp. 114-5.

a lot of other statistics, it revealed the probability of getting an immediate loan of an item requested via a union catalogue to be only 62%. The full survey was printed as Appendix 4 of the Parry Report.*

Urquhart wanted the NLL to lend directly to any qualified organization in the country (certainly this would include libraries) and if this meant holding three or four copies of the heavily used titles, it was still worth it. He pointed out that, based on the mathematics of probability,

> if the postal service is used, it appears that as a rule, two or three copies of a publication in one lending library would provide a better service than could be obtained from one copy in each of ten regional lending libraries.**

Because the distance between any two large centers of population in Britain is rarely over 500 miles, domestic mail posted in the early afternoon can be expected to reach its destination by the following morning; and the mechanics of such an operation (packaging methods, recall procedures, rapid, temporary storage arrangements, etc.) had been sufficiently tested at the Science Museum Library to know that it was feasible. The survey which revealed the dearth of Russian scientific literature was, as we have seen, dramatically vindicated within a few months, and became a crucial factor in further planning of the NLL. In later years, Urquhart was able to remark that he has "always regarded Sputnik I as a publicity venture for the Lending Library Unit."***

If these were ambitious conceptions, the limits to the service that could be offered were not overlooked:

> The NLL does not propose to cater for the student, nor does it aim to provide literature about science for the general reader . . . The main aim of the NLL is to assist the practitioners of science, that is, research workers, technologists, engineers, and agricultural experts.****

--an easy, though not exclusive, test of the level of material was "Is

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* University Grants Committee, Report of the Committee on Libraries. London, H.M.S.O., 1967. Naturally the Director of the NCL has taken issue with this interpretation; vide the exchange of letters in J. Doc. 24, nos. 1 and 2, pp. 62-3 and 120-1.

** "A National Lending Library for Science and Technology" by D. J. Urquhart. J. Doc. 13 (1) March 1957, pp. 13-31.

*** Letter to Author, April, 1969.

**** "Cooperation between the NLL and public libraries" by D. J. Urquhart. L.A.R. 62 (2) Feb. 1960, pp. 50-2. The medical sciences were included in this shortly afterwards, and coverage was expanded in 1967 to accommodate the social sciences.

it abstractable?". The library would not be equipped to lend to individuals, nor could it serve as a technical information bureau. For its acting as a referral center or clearinghouse there was anticipated to be no significant need if all went well. It was emphasised from the very beginning that the creation of a new national library did not mean that other institutions could just donate their scientific collections to the NLL and cease to operate a service; they would still need to maintain, and probably expand, their own holdings--but the NLL would now be standing behind them, ready to guarantee in real-life operating conditions, not merely in theory, the completeness of their service to science. And along with an enormous increase in coverage would come a much needed drop in the response time; whereas after two weeks from any given request date the NCL would still not have supplied 32% of the requests for loans from its stock, the NLL was being designed to satisfy loans by return of post.

During the transition phase, when the Lending Library Unit was gearing itself up for the moment when it would emerge as a national library, it was decided to create a permanent advisory body of scientists for the new service: the D.S.I.R.'s own Research Council directed that:

> the Secretary of the Department should appoint a consultative committee, through which users of the library can present their views on the nature of the services provided for them. Its Chairman is Sir Lindor Brown . . . and its membership is broadly representative of the different fields of study and the main groups of users. The committee should ensure that difficulties are seen and considered as soon as possible and should help put the public relations of the library on a sound basis from the start.*

The idea of situating the library entirely away from London began to crystallize: it seemed sensible, given the circumstances, that if it could be done, it should be. As we have seen, the original thought which loomed large in the postwar years was one of security, but the warning signals were out for a tidal wave of scientific publication, and an unusually large site would therefore be essential. The plight of the Science Museum Library had demonstrated the dangers of being trapped in an unextendable building, and for the envisaged size of the NLL, no site in London would be financially possible. In fact, a location nearer to the geographical center of the British Isles would allow a more efficient use of the postal service to such important industrial regions as South Lancashire; the West Riding of Yorkshire; the Tyne-Tees area; the Glasgow-Edinburgh axis; and Belfast, N. Ireland. Borrowers in London could still be reached by overnight mail, which is all that would have been possible from one point in London to another. Admittedly, it would help if the site could be within, say, 15 miles of some sizeable town capable of handling a huge volume of letter and parcel post every working day of

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*D.S.I.R. Report of the Research Council for 1959. Cmnd 1049. London, H.M.S.O., 1960. p. 24.

the year, but if the new library could be set, not in the city's noise and dirt, but in rural England's fields and flowers, so much the better.

Finally, the library being an agency of the Department of Scientific and Industrial Research, which was subsequently gathered into one large Department of Education and Science (1964), it would be run by trained scientists from the scientific branch of the Civil Service, rather than by career librarians. The necessary library procedures could presumably be quickly learnt by a staff of graduate level scientists, documentation oriented; but their subject expertise could hardly be acquired by a working librarian, however conscientious. Besides, conventional library procedures were not going to be at a premium. Rather, the whole idea was to allow scientists to design and manage their own library, for their own type of need. It should not be forgotten how radical an innovation this was in Britain, and it was unquestionably the correct decision. In 1966 Urquhart was to write:

> None of the staff here have attended a full-time course in librarianship which has lasted more than two weeks, and, frankly, having regard to the present nature of library education in this country, I think this is probably a good thing.*

It would be, then, Britain's national library of science, aiming at a comprehensive world collection (the only agency in the country able to afford this); it would operate by a rapid loan service through the mail, directly to the organization submitting the request; it would unhesitatingly buy multiple copies where necessary--probably at a rate hitherto undreamed of; it would serve "the practitioners of science"; it would have to work predominantly with journal literature and ready itself for phenomenal growth; it would have special responsibility for collecting and disseminating Russian material; it would act as an educational force in the use of scientific literature; and, for choice, it would be built somewhere near the middle of the country. With this as a matrix, Urquhart began to search for a site.

It had been estimated that the building would cost approximately 600,000 pounds, so the land, if it were not to add to the expense, could best be some piece of state-owned ground. When enquiries were made to the Ministry of Works in Whitehall, it was pointed out to Urquhart that there were several government sites in the geographical area he had outlined which already possessed large, spacious, disused buildings. These were the Royal Ordnance Factories built during World War II, generally situated out in the countryside for strategic reasons, and silent since the end of the war. Typically, they consisted of a complex of sturdy, one-storey, brick factory buildings with low slanting roofs, each unit distinctly separated in case of explosion, and all set discreetly in an extensive restricted area. Some were being sold up or demolished, but many were just standing idle with future undecided, against the lingering

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*"Some Ideas behind the NLL." p. 1.

fear of a new outbreak of hostilities; and the proposed national library could have one free of charge. This was excellent.

Urquhart thereupon examined about 36 suggested locations, most of which failed to meet one or other of his requirements. From those few which looked possible he eventually found what he was seeking near the small rural village of Boston Spa, in the fields of his home county, Yorkshire (see map). Sitting roughly in the middle of the Leeds-York-Harrogate triangle, the site was, for a library, unimaginably big--60 acres. The five clustered buildings were all in sound condition, and the major northern city of Leeds was within 12 miles, directly accessible along a main national highway ("A 1", The Great North Road) which also swept down to London and up to Scotland. From here the library could be in fast postal communication with every part of the British Isles. The cost of converting it would be perhaps 250,000 pounds, only 42% of the previous estimate. But immensely more gratifying than the financial saving would be the saving in time. All the traditional lengthy haggling over the architect's plans, the bureaucratic delays, and the building time itself could now be sidestepped. The library could be set up and operational in about three years instead of six, and that, in the situation that existed, was literally priceless.

Work was started late in 1958, two years after the initial decisions and one year after Sputnik; the enormous task, psychological as well as physical, of moving a library which already comprised about a thousand tons of literature to a new home 200 miles away in the North of England, began some months later, and was accomplished primarily by rail. The Royal Ordnance Factories had naturally had their own branch-lines, but unfortunately the one at Boston Spa had been torn up just prior to this unexpected new lease of life for the establishment. The stock was therefore sent in road-rail freight containers to York by rail, and transferred without unpacking to trucks for the remaining 14 miles. For some weeks beforehand, patrons were provided by the library with the new return address for their loans; the move as a whole was so carefully and realistically planned that through it all the existing level of service was not interrupted. In retrospect, this seems like a logistical miracle, and constitutes a matter of praise for all concerned.

The regeneration of a munitions plant into a national library involved joining the buildings by a series of windowed corridors; erecting long rows of stacks on the open floor areas of the factory workshops, one of which had a mezzanine; installing better general lighting, and in particular, illuminating the aisles between the stacks; fitting an adequate system of air-conditioning (the air is heated and washed, but the climate does not warrant refrigerating it); creating the necessary office space; enhancing where possible the ubiquitous brickwork into a decorative asset; and generally brightening up the whole place, inside, outside and round about. Happily, there was no need to strengthen the floors, as is usual when a building is adapted for library purposes--they were solid concrete.

A valuable nucleus of staff from the Lending Library Unit accompanied the stock from London, many of them to settle permanently in Yorkshire:

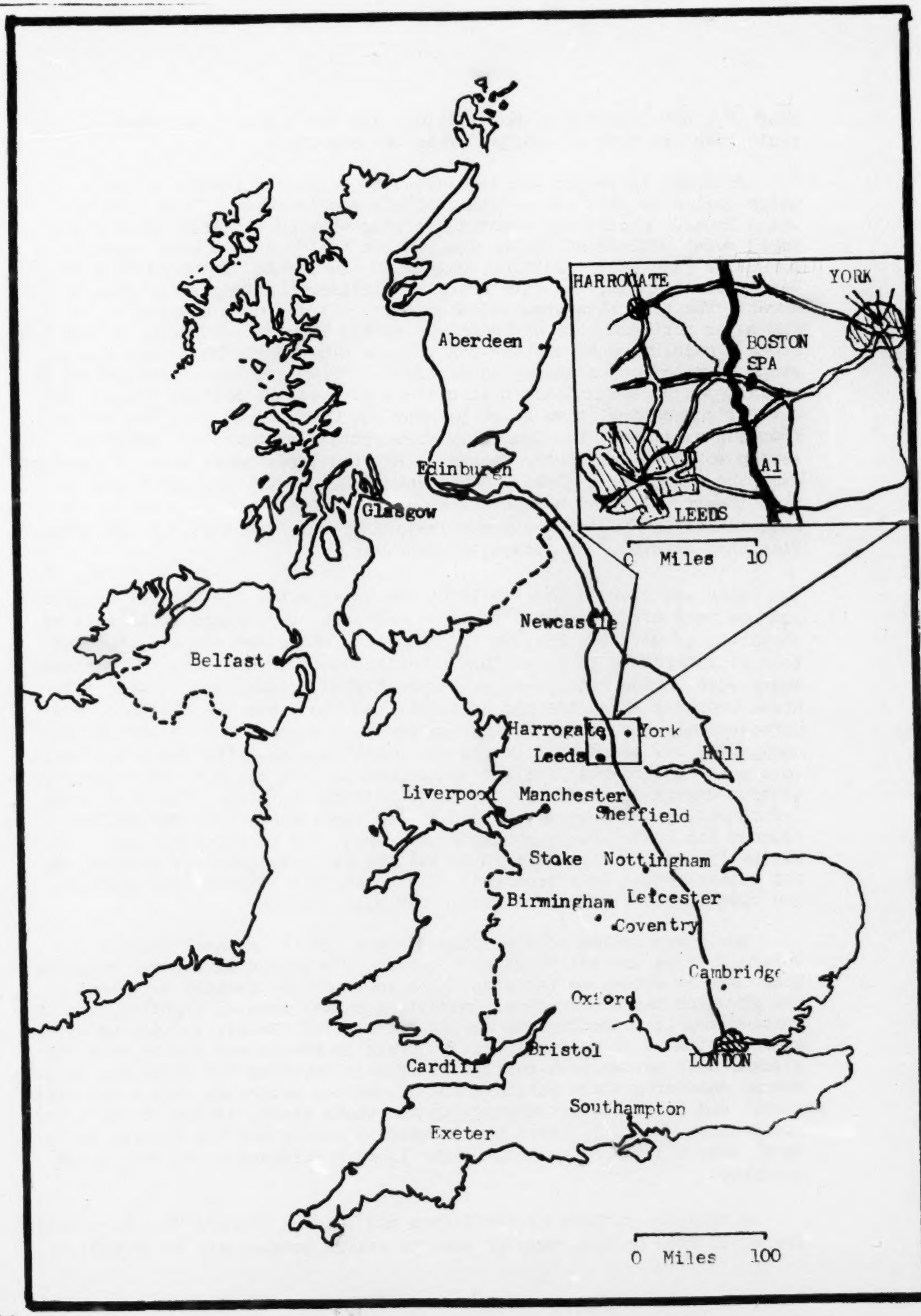

Figure 1. British Isles, showing location of NLL.

the balance was recruited from the three surrounding cities. Sophisticated city-types from London, and shrewd, blunt Yorkshiremen: two such groups are startlingly different--and often innately abrasive--in the variegated little world of English subcultures, but they have coalesced admirably in the NLL, not least because the Director is a man whom both of them can call their own.

Not surprisingly, the NLL went into service even as it was still coming into existence in 1960 and 61. It was officially opened by the Minister for Science, Lord Hailsham (formerly and subsequently Mr. Quintin Hogg) on 5 November 1962, by which date the collection had broadly reached the dimensions foreseen six years previously, having grown to 350,000 volumes, plus 125 miles of microfilm, with 22,000 serial titles on order. And loan requests already numbered over 4,000 per week.

All this had been done in the remarkably brief space of six years; and in the equally short span of time since its appearance on the British library scene, the NLL has come to occupy a solid central position. As the national web of borrowing organizations has continually grown more intricate (there are now over 3,200 of them) usage has increased steadily by about 25% annually, with the volume of business for 1970 projected to be well in excess of one million requests. In addition it has been a notable catalyst; a major subject of discussion in the library world, a source of important documentation research, a leader in teaching the use of scientific literature and, as the largest scientific library in Europe which also manages to be a paragon of government efficiency, something of a national showpiece.

With this as background, it is time to turn our attention in the remaining section of this paper to the present; to the actual character of this unique library in operation. We will look at the NLL from such aspects as its coverage; its acquisitions procedures; its techniques for maintaining a fast postal service; its personnel structure; the significance of its different collections; and its enthusiastic acceptance of its role as library researcher and public educator.

II

Coverage and Acquisition

As we have seen, the NLL's mandate is an enviably wide one--to collect and hold available all the world's scientific and technical literature, past and present. There are naturally some practical limitations to this, which will be discussed in a moment; but originally it meant all the research, scholarly, and other material of serious information in science, technology, agriculture and medicine; everything which was "judged to be of value to the practising scientist or technologist", as the library's handout on Subject Coverage says. In the even broader terms of Dr. Urquhart:

the criterion has been that if a serial contains <u>something of interest</u> it should be included, irrespective of the language.*

The element of judgment here implied (deciding what is "of interest" or "of value" to your library's clientele is of course the fundamental selection problem) is in the hands of trained scientists-turned-documentalists drawing on i) their own professional experience or subject competence, ii) their thorough familiarity with the library's definitive range of selection aids, and iii) the underlying NLL policy of maximum inclusiveness toward the building of a world collection. Almost all statistics concerning the NLL are fleeting, due to its tremendous upward surge in size and usage; but as of mid-1969, the library had more than 32,000 serials currently being received from about 110 nations, with a further 3,000 titles on order. Titles no longer current which are held to some extent by the NLL exceed 34,000--this figure includes "dead" publications and those which have changed their title, however many times. In terms of "traditional volumes", an expression not particularly significant when considering periodicals, this amounts to over 650,000, and the microform collections increase this figure substantially--reports held on fiches alone number over 150,000 ("Probably . . . the largest collection in the world outside the U.S.A.", Urquhart, op. cit. p. 8), while the 160 miles of microfilm represent a further 100,000 volumes. Together, serials and microforms constitute the main channel by which new scientific work is nowadays made public, and, quite logically, they account for perhaps 80% of the NLL's time and money.

Books, on the other hand, rarely contain much that is new--rather they have become the secondary method of scientific publication, functioning as synthesizers and consolidators of present knowledge in the particular subject or topic, and as review media. This relegation was inevitably the outcome of the faster speeds of information transmission which modern science both demanded and created. Dr. Robert M. Hayes, Director of the Institute of Library Research at the University of California, Los Angeles, in teaching the hierarchy of scientific publishing, employs the following fivefold structure, which will illustrate exactly why the book does not, and cannot, hold the pride of place here which it does in the humanities:

1. <u>Internal project-information</u>: raw data; test and experimental results; engineering drawings; configuration control data; reliability data; in medicine, patient-monitoring data.
   <u>By</u>: telephone, office documents, etc.
   <u>Transmission time</u>: minutes and hours.

2. <u>Inter-project information</u>: communication with outside workers in a related field, through special interest groups of learned societies, information exchange networks, the "invisible colleges" etc.
   <u>By</u>: telephone, personal letter, newsletter, mimeographed sheets, etc.
   <u>Transmission time</u>: from about 2 days to 2 weeks.

*"Some Ideas behind the NLL", p. 7. (my emphasis)

3. Report literature: first tier of formal publication, and a prime growth area in modern scientific information techniques. Unevaluated information, reporting experiments performed (often on contract to an agency of the U.S. government). Limited utility as to time, subject, and number of persons interested. Major distributor, the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia.
By: paperbound pamphlets, microfilm and, increasingly, microfiche.
Transmission time: from about 2 weeks to 3 months.

4. Journal literature: material which has been found definitely worthwhile; reports, data etc., which have passed professional scrutiny and editing, for formal presentation to the scientific world. Often useful only for 2-5 years.
By: scientific periodicals (weekly, semi-monthly, monthly, quarterly, even annually).
Transmission time: 6-18 months.

5. Books and other monographs: permanent, well-founded, authentic information. Evaluation of a pattern of work over perhaps 10 or 20 years; discussion of broad trends for the future, etc. In effect, sometimes also in intent, a selective review medium.
By: conventional book publishing.
Transmission time: 3-5 years.

--and this subordinate role of books in science is reflected in the NLL's much smaller stock with its much smaller volume of usage. In March 1968, the NLL's intermittent handout on statistics stated that the library's scientific books in English totalled about 41,000, with an intake of some 800 per month: those in Russian numbered as many again, with an accession rate of about 400 per month.

In order to understand the position of the book collection more fully, it will be necessary to glance back for a moment to the preliminary planning of the NLL. It should be stressed that it was never intended that the birth of the NLL should entail the death of the Science Museum Library; merely that the older institution should revert to a more archival function with a slower rate of growth, by transferring its overburdened loan service to the NLL, whilst continuing to serve Imperial College until such time as Imperial College could make other arrangements.* In 1957, when stock for the new library began to be

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*The College's efforts to build up its own resources led to the establishment of the Lyon Playfair Library (1969) in a new building designed to house it and the SML independently. Imperial's usage of the SML has thus declined sharply, though College members still form 60% of its readers. It was left to the Dainton Committee (op. cit.) to make the obvious suggestion that the two should unite under the College's administration.

trucked across London to the Lending Library Unit, the clear trend towards a huge demand for periodicals on loan had caused the journals to be taken, the books to be left. And apart from genuinely archival documents in the history of science (the early printed books or rare editions, which could never form part of a public loan collection, and whose exclusion from NLL stock is automatic) a great majority of the books were left for mere logistical reasons when it was realised that they would be grotesquely difficult to decatalogue, requiring the extraction of up to 35 added-entry cards per title.* Thus it was agreed that the occasional requests that the NLL might receive for such material could be forwarded directly to the Science Museum Library, which would then lend where appropriate, as it had been doing since Dr. Bradford's day. Russian works, as we have seen, possessed a special significance and these were therefore taken; in fact the NLL has been buying Russian books continuously since that time (1957), whereas it has only been buying books in English to add to the small nucleus it did remove from the Science Museum Library, since 1960; so that, even with double the accession rate they have only recently overtaken the Russian stock. In the last few years, however, the rate of increase in English language books has begun to quicken.

Acquisition of books in other languages can be stringently selective, for these are seldom the vehicle of new scientific work which is totally unobtainable elsewhere--the retrospective function of scientific books applies internationally ("it is found that few requests arise in the U.K. for, say, Polish books on electrical motors"--Urquhart, op. cit. p. 8). The NLL has been collecting the important books in French since 1964, and in German since 1965, but it should be stated that the library will readily change its mind and acquire any such book for which considerable demand arises. In these circumstances, however, a translation of the entire book is frequently called for, and this aspect of the NLL's service will be discussed later. By mid-1969 the holdings in all languages other than English and Russian totalled about 30,000 volumes.

In keeping with the original definitions of its purpose, the NLL does not as a rule stock purely educational material (college texts, etc.), magazines for the do-it-yourself addict or the hobbyist, or other popularisations of science. But this boundary is a particularly hard one to draw, and to adhere to once drawn, and the rule may be judiciously broken where the all-important element of a demonstrated demand seems to warrant. For instance, one of the factors bearing upon the exclusion of popularisations of science was their assumed ready availability from other sources, e.g. the local public library, or departmental collections in universities. Yet Scientific American, New Scientist and Science have proved to be among the titles consistently in heaviest demand from the NLL--so much so that to argue about intellectual boundaries becomes mere pedantry; they and others like them are therefore kept in multiple copies.

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*I owe this singularly depressing piece of library information to Dr. Urquhart's able co-worker in the planning and establishing of the NLL, Miss R. M. Bunn.

The collecting of theses has not so far been an area of major exigency to the NLL. This is not to say that it possesses none at all; in fact, largely through its collecting of microform materials, it has amassed over 30,000 foreign theses. Several considerations are to be borne in mind: first, it is the duty of the academic body concerned, to maintain the master collection of its theses, and most of the lending is done to other universities as a kind of courtesy within the scholarly world. For this purpose, an institution often likes to use its own theses as the appropriate bargaining asset. Second, a further reason for a university to do this is the matter of copyright. Third, the acquisition of a thesis has not often in the past been a straightforward purchasing transaction; certain British universities have sometimes voluntarily submitted a copy of one, but the NLL is not a depository library for this, nor for any other, material. Since it probably obtains no more than 15% of its stock from British sources, and since a copyright proviso that functioned with less than the speed and reliability of a simple commercial arrangement (as most of them do) would be inimical to its deepest commitment, the library sees no valid grounds to consider becoming one. Fourth, Britain still lacks a "University Microfilms" type of project, which develops a central, nationwide collection of theses for public dissemination at the same time as it provides an excellent omni-disciplinary reference tool from that collection. Fifth, thesis work in science and technology normally leads to at least one published paper containing the meat of the findings. In some cases this may even be the complete thesis. The NLL's colossal serial-gathering mechanisms will therefore ultimately sweep in most of the essential research involved.

For such reasons as these, and also perhaps because it was facing (in the national shortage of scientific serial literature) a logistical challenge of the first magnitude, the library has never been aggressively concerned with the collecting of theses. As the demand has been rising, however, the NLL began in early 1969 to negotiate about obtaining a full set of the theses covered by Dissertation Abstracts, at least in the fields of science and technology. I do not believe it contemplates trying for anything like a comprehensive collection of British theses in the immediate future, these being as a rule somewhat more accessible to its clientele via direct application to the university in question than are American dissertations.

The NLL's loan service to science and technology having in a few short years drastically enlarged all conceptions of what could be done, it was not long before people began to speculate about applying its techniques to other broad areas of knowledge which were now discovered to be suffering from inadequate library provision at the national level.

One such area, which seemed to combine a critical need for improved service with an affinity to the subjects already present in the NLL, was the social sciences.

In Britain there are steep intellectual barriers to efficient bibliographic and library service for the social sciences; some arising from an existing library structure which is increasingly ill-suited, others, more fundamental, from the lack of authoritative definitions operating

within the discipline itself. It is only just becoming agreed, for example, which traditional subjects, and which parts of those subjects, can be termed "social sciences". One particular preoccupation has been the degree to which they are exact measuring sciences analogous to biology or mineralogy (cf. psychology, sociology, anthropology) or "humane" studies merely performed with the sharper critical edge of 20th century analysis (cf. comparative religion, international relations, public administration). Such ancient studies as history and law are now generally included, whilst others have caused a certain amount of controversy by their assumption of the modern word "science" (library science, political science, management science, military science).

The NLL's main serial collection had already approached the science/social science boundary by accepting such marginal subjects as forensic medicine, econometrics, psychiatry, geography, and the technical aspects of printing, painting, architecture, etc. Even on this coincidental basis it was soon found that it had become Britain's "largest inter-library loan source in the social science field".* The National Central Library's network, in other words, was failing to meet the need, which seemed to be predominantly for periodical literature. This was powerful evidence, for those interested in the question, that the social sciences were more akin to science and technology; on the simple practical level, it indicated the onset of the familiar problem of supply and demand. From either viewpoint, improvements were clearly necessary. The government was provided with a basic policy recommendation in 1965 when its Committee on Social Studies declared that "a strong case exists for lending facilities"** such as the NLL was mounting for science and technology.

The NLL, for its part, was now ready to welcome an expansion of its size and responsibility. The library had settled down to business and was functioning smoothly; the local postal service, by an admirably rapid feedback, had actually begun to improve under pressure of the heavy increase in traffic; the social sciences were already a presence in the NLL's main collection; and there was every indication that <u>this</u> pattern of demand was similar in form to that currently being supplied. The significance of the haste with which people were turning to the NLL for social science material was not lost on Urquhart--the other national or special libraries were going to fail to meet the mainstream of demand, and for just the same reasons as before: no comprehensive collection existed, and most of what was present somewhere in the country (usually London) was not nationally available upon demand. He therefore began to press for official recognition of what had been foreseen by many at the NLL--namely, that the NLL was the agency best equipped to shoulder the problem of the social sciences. Agreement on this was prompt, and specific discussion and committee work began in the Spring of 1966. They proceeded, as before, experimentally: they gathered evidence from the field, formulated a hypothesis and organized their service accordingly.

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*"NLL and the social sciences" by D. J. Urquhart. <u>J. Doc.</u> <u>23</u> (1) March 1967, p. 2.

**<u>Report of the Committee on Social Studies</u> (Chairman, Lord Heyworth). Cmnd 2660. London, H.M.S.O., 1965. Para. 173.

Inevitably, there were suggestions that yet another museum-library combination be created, storing the primary materials under one roof with the research literature, but the weight of past experience disposed of this idea--it had, after all, been the whole aim and object of the original enterprise to remove the main body of library activity from the jurisdiction of the Science Museum, and the NLL could no more collect comic books or Christmas cards for the social scientist than it could supply flowers to the botanist or stones to the geologist.*

It was also apparent at an early stage that the most urgent national deficiency in social science documentation related to periodicals, not books. The social sciences being still appreciably under the influence of the humanities (especially in such areas as history, law, religion), books were easily available to most institutions. But periodicals, particularly those in languages other than English, were scarce. Bearing in mind the de facto existence in the library of a creditable basic collection of social science serials, and perhaps too on economic grounds, it was decided by the NLL's parent Department to make this shortage the first target. This compromise did not wholly satisfy Urquhart, who by now possessed growing confidence that he had found the general solution to an acute problem of modern library service, but it should be remembered that most observers of the NLL phenomenon believed then, and for some years to come, that this was essentially a library born in the world of Science to serve a pattern of demand that was unique--that it was, in fact, more an information center than a real library. It was therefore not surprising that the government authority was of a mind to stipulate that the library's first attempt to lend non-scientific literature to a non-scientific clientele should focus on periodicals: in this way, the venture could be closely monitored in conditions where failure, should it occur, plainly could not be attributed to the NLL's innovative approach to serials, for it was by this date (1966) successfully handling serial loans at the rate of over 400,000 a year.

As before, the first test of suitability was "Is it abstractable?": the full range of bibliographic publications in social science was purchased en bloc so that, as a minimum, every request originating from a citation therein could be met. And once again, a strenuous program of acquiring back-sets was organised, with the result that by October 5th, 1967, the collection had achieved sufficient depth for the new service to be formally announced. The complete operation, which had boosted the library's size by 10%, had taken just 18 months.

At this point, with the service a little over two years old, usage data attests unmistakeably that the NLL can accommodate the serials demand with relative ease. A survey undertaken in April-May 1968** revealed that after only six months of operation, the new service had attained a

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*"NLL and the Social Sciences" by D. J. Urquhart. J. Doc. 23 (1) March 1967, p. 4.

**"The NLL's collection of social science periodicals" by D. N. Wood and C. A. Bower. Lib. Association Record 71, (2) Feb. 1969, pp. 39-40.

success factor of just over 80%, or almost that of the library as a whole. For very recent publications the figure rose to 95.9%, and for material published back to 1940 it was never less than 61.7%. As to types of borrower, the Universities, which are overwhelmingly the center of social science research in Britain and therefore have at least adequate base collections of their own, had the lowest rate of success (72.9%) because they tended only to need older items; from public libraries 81.3% of the demand was met, whilst from industry (clamoring for management data) the figure was 90.5%. Analysed by subject, the results naturally showed that fields close to science and technology were well accounted for (statistics, 89.0% supplied) whilst the failure rate was more marked in areas where the library had "gone in cold" (education, 66.7% supplied).

The collecting of back-sets is proceeding, with help from the reports and statistics obtained from other libraries and the NLL's own evaluation of requests made to it. More than half of the failures are requests for back issues already on the library's widely distributed want lists, and only a very small fraction is for titles not held to some extent.

As regards national library service for the humanities, the terms of the discussion have naturally been rather different, though as early as 1960, even before the Lending Library Unit had become the NLL, Urquhart postulated certain trends emerging which have only come to the general notice after the factor upon which he was basing his comments, namely the solid, continuing success of the centralised loan collection, has, through his labors, become a reality.

That some measure of reorganisation was called for, no one seriously doubted; but because of the long and complex history of librarianship in the humanities, because of the traditional book-oriented publishing, and the intrinsic importance of the concept of personal authorship, and the much wider spectrum of user needs, it was soon obvious that a straightforward duplication of the NLL's modus operandi would be neither possible nor desirable. The very presence of the British Museum casts a huge shadow over all discussions of change, for not only are its stupendous collections of major significance, but as a consequence, its opinions are too. Or, to put it another way, the main responsibility, and the ultimate power of decision, regarding the deployment of the material in the BM rests with the institution itself, in the shape of the Trustees: "the British Museum", said Urquhart "is wedded to the idea that its purpose is to preserve literature for posterity. Lending is anathema, and there is even an Act of Parliament to stop it."* Sir Frank Francis, just before retiring as Director and Principal Librarian, to the disappointment of many, expressed a hope that the book collections should remain integrated with the Museum proper. The question of the correct posture of a legal deposit library and a "national collection" is still a burning issue, which the advent of widespread cheap photocopying has abated to some degree--though it has of course created fresh problems.

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*"The Needs of the Humanities--an outside view" by D. J. Urquhart. J. Doc. 16 (3) September 1960, p. 129.

The inter-library network which radiates from the National Central Library in Store Street, London, was constructed primarily for the use of the nation's public libraries; historically, it is linked to the adult education movement which arose in the early 20th century. Consequently, it has always served a range of borrowing which is noticeably closer to the humanities than to science and technology--history and religion are two of its biggest concentrations. Add to this the British universities which, as a group, have assets in the humanities far surpassing their holdings in science and technology, and it is clear that any soundly conceived changes in national library service for the humanities will have to work with, and upon, an existing structure of considerable age and sophistication.

Urquhart's 1960 paper on the needs of the humanities (loc. cit.) covers such topics as the reasons for the failure of the union catalogue approach; the feasibility of a rapid lending service for that important segment of humanities research not dependent upon personal examination of precious copies; the problem in very large libraries of storing little-used older material; and the need for the humanities to take advantage of modern techniques of documentation. In such matters as these, he was perhaps a decade ahead of his contemporaries. Many of his positions are accepted or implied in the Dainton Report. What he naturally could not foresee, however, was that instead of pursuing his very pragmatic suggestion that the National Central Library was "a weak, but possibly the only, candidate to house the prototype for the National Lending Library for the humanities" (op. cit. p. 129) the Dainton Committee in 1969 was to simply recommend the transfer of NCL stock and catalogue up to Boston Spa (para. 259 of the report).

In two substantial letters published recently in Library World* Urquhart has expounded his conviction that the NLL can handle books with no particular difficulty. Although it was true in 1962 that its book collection was too tiny to be very useful as an inter-library resource or as a test case of the NLL's loan methods, and although it will continue to be true that the library's predominant interest lies in the world of serials, yet by 1968 the NLL was supplying over 42,000 book requests annually--once again, as with social science periodical loans, it had become almost casually a bigger force than any other library in inter-library activities.

Given that the NLL is a library with a charter for inclusiveness, and that it is assured of sufficient funds to carry out its mandate, it will be obvious that very few of the customary worries over selecting material which a) will conform to the library's individual character and which b) the library can also afford, are present to cause frustration. The library can buy everything that it knows it should have. The bulk of its purchasing is of course done through agents, each being given a blanket order on a geographic basis. If we add that all record-keeping is kept to the bare necessary minimum at the NLL, it is understandable that the selection and acquisition function can be totally

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*Library World 70, #823, January 1969, pp. 188-89, and #825, March 1969, p. 246.

controlled by about four graduate scientists with a clerical staff of about ten.

From the agents, the discount averages the customary 10%. The procurement of more esoteric items is sometimes only achieved by an exchange agreement, with the NLL acting as the British agent of, say, the Academy of Sciences in one of the lesser republics of the U.S.S.R., and receiving in turn many valuable Russian language desiderata. A third category of material is that supplied, for example, by agricultural research stations in many parts of the U.S.--free for the asking. And finally; 13 years after the original appeal by the Lending Library Unit, donations of assorted back issues are still arriving by the truckload at a rate of roughly four tons per month; less than 25% are now retained.

With the temporary exception of the social sciences, the NLL's stocks are now broadly adequate to meet the requirements of a national collection: the average success factor for 1966, 67 and 68 has remained steady at about 85%, even though the loan demand skyrocketed by no less than 93% during those three years. The percentage of requests for legitimate material which has slipped through the acquisitions net is tiny--just over 1%--and the efficiency of the procedures for obtaining new serial titles immediately upon publication is reducing that percentage all the time. Yet despite this, and somewhat amusingly for those who like to watch human ingenuity outwit the large aggregational operations of the organization, it is these unsatisfied loan requests, rather than the big abstracting and indexing organs, which have persistently proved to be the NLL's best means of learning of gaps in its collection.* Often, but not always, they are requests for new publications which the NLL is on the verge of hearing about through the usual bibliographic channels.

Principles of Storage

In the Reading Room at the NLL stands a set of charts and pictures displaying to the visitor the scope and activities of the library. One of these very pointedly depicts a dinosaur, now extinct because it could not adapt to a changing environment. On the same chart is a picture of a card-punching machine. The message is that record-keeping at the NLL has been strictly controlled, in order to prevent the growth of one of these huge, unwieldy monsters (called card-catalogues) which tyrannise most libraries. All the primary serial data is kept on Hollerith punched-cards--there is no traditional Author, Subject, or dictionary catalogue. The fact that the library was designed by scientists not indoctrinated into what Dr. Urquhart sees as the librarians' essentially religious attitude of devotion to catalogues, undoubtedly helped to bring this to pass, and given the operating conditions of the NLL, it works with striking success.

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*This was pointed out to me by the deputy Director, Dr. K. P. Barr, part of whose job it is to supervise the close and continuous monitoring of requests that the NLL cannot fulfill.

Among the conditions which have made possible this far-reaching innovation of running a major national library on a bare minimum of records is first, the fact that the NLL is a closed library. This means that the records do not have to stand in the lobby as a public bibliographical guide: the traditional question of "What is in this library on a particular subject?" is in large measure irrelevant, since, the NLL's collections are now virtually complete, whilst the literary man's preoccupation with works by one author has little or no interest to the scientist seeking objective, impersonal research data. Nor do the records need to be a public finding-list of the library's holdings--all that is necessary is that NLL staff should know how their library is arranged. Second, demand at the NLL is standardized to a degree that public libraries, for example, can only dream about. This has been the logical result of taking the highly homogeneous area of scientific borrowing, where the characteristic citation of journal, volume, page and author is employed with overwhelming consistency, and subjecting it to the further standardization of the NLL's printed postal request form, to which the borrower, since he is not able to make his request in person, bolstered by gestures, descriptions, and hazy recollections, absolutely must conform with accuracy and completeness if he is to get the material he requires.

With the borrowing process so rigidly itemized, and no public access to the stacks (no browsing), there is thus no need for the complexities of a subject approach to either the records or the shelving. That being so, the basic principle of storage at the NLL was made the simplest one feasible, i.e. the alphabetic, the title page being taken as standard. This gives any member of the staff the means of physical or intellectual access to any title without regard to the subject or the language, and without delay. That is how the punched cards are filed, and how those few necessary records generated by them are arranged. Once this is comprehended, then all the other factors affecting storage to be presented hereunder will be seen to be only modifications and refinements of the fundamental alphabetic principle. They may look like more--some of these secondary controls involve large issues of library practice and permeate almost the entire stock--but they are essentially additions, supplements, variations of the underlying alphabetic unity of the whole. And every filing procedure the NLL now employs has been adopted only as circumstances have compelled, and with the same goal as the original one of equipping the library with the easiest, clearest, quickest, most direct and least expensive system of manipulating its collections, free of the conventional limitation that a procedure or system was unavoidable here because other libraries happened already to use it.

To begin at the lowest level of control--the monographs: the straight alphabetic sequence of titles (with the conventional omission of initial articles) has been found sufficient:

> As far as English-language books are concerned, these are filed by title and "processing" consists only of underlining in pencil the initial filing word on the title-page. We did not know when we started whether this system would work and for a time we checked up on all our English-language book failures to see if we were failing to find books because the

> titles requested were mutilated. It might very well have been that, besides excluding the definite and indefinite article from the title used for shelving, we would have had to develop a list of prohibited words, including such words as "introduction", "guide" etc., but we found this was not necessary.*

Foreign-language books other than Russian (these are without exception written in the Roman alphabet) have their own title-alphabetic sequence. But Russian books are not arranged by title--that would only create fresh problems of transliteration, and confusion as to which alphabet was being employed, etc. Instead they are filed by the most convenient direct sequence to hand, namely their accession number (in the form R12345). This means that stores staff can issue and reshelve them without having to know Russian.

Moving up a rung, to periodicals; this problem of linguistic inaccessibility is one reason why each serial title is given a numerical identity (shelfmark), written onto the accession stamp on the front cover; each item can thus be handled accurately and swiftly even if the cover information is variable, confusing, unintelligible or just absent (Zonghua Neike Zazhi is 9512.8397, whereas Zonghua Waike Zazhi is 9512.840). Not surprisingly, this is also the library's method of differentiating between two or more publications with identical titles:

Hospital - London -	4333.076
Hospital - New York Spanish Edition -	4333.080
Hospital - Rio de Janeiro -	4333.085
Hospital - Tokyo -	4333.090

and between two or more subdivisions of one publication

Zentralblatt für Mineralogie,	Teil 1	9510.000
Zentralblatt für Mineralogie,	Teil 2	9511.000

--the shelfmark has four digits with (at present) up to four decimal places, which theoretically allows for a total of 100 million serial titles. Numeration is continuous for the whole serial collection, with the proviso that Cyrillic periodicals, of which there are between 1900 and 2000 titles currently received, have their own reserved block of shelfmarks at the beginning. They are shelved according to the Cyrillic alphabet, and, as far as possible, serviced by stores staff who understand some Russian. Immediately following them is a sequence of about 160 titles, being the regular, routine (as opposed to occasional) cover-to-cover translations of some major Russian serials; these also are filed alphabetically. Together these account for numbers 0000.000 (not used) through 0433.000, and the main run commences with 0537.100 (AAAS Bulletin) and ends after the Z's with a few journals having bibliographically "odd" titles (8 MM Magazine, 33, etc.).

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*"Some Ideas behind the NLL." p. 4.

However, the usual overcrowding occurs at commonplace publishing terms: in scientific periodicals these are words like, Abstracts, Acta, Annals, Bulletin, Journal, Proceedings, Publications, Report, Yearbook, and their parallels in the languages of international science. To mitigate the congestion of, for example, over one thousand journals called "journal" a neat and natural subdivision has been made into "journals . . . of societies, institutions etc." and "periodicals having distinctive titles commencing . . . 'journal'"*

Thus Journal - American Dental Association
Journal - Japan Institute of Metals
Journal - Manx Museum . . . etc.

are followed by

Journal (of) Abdominal Surgery
Journal and Proceedings - Institute of Road Transport Engineers
Journal (of) Electronmicroscopy. . . . etc.

A title-change from Journal--Japan Institute of Metals (above) to, say, Japanese Journal of Metals would cause all issues bearing the new title to be transferred from the subalphabet of Journal--Societies into the main sequence under Japanese, and would necessitate a new shelfmark and physical location, and appropriate cross-references.

During the early planning of the NLL, analysis of the flow of demand upon the Science Museum Library, and later upon the transitional Lending Library Unit, had shown that there existed two "facts of life" sufficiently large and sufficiently constant that the new library might profitably organize its procedures to fit them. These were: i) a persistently heavy demand for a group of about 1200 titles,** and ii) the familiar problem of the short but busy loan life of scientific material, with a critical drop at about the fifth year, after which an issue could almost be regarded as "dead". Bearing in mind the physical configuration of the library, a cluster of open-floor sheds linked by corridors, some kind of partition of the collection was on the cards from the first, and these have proven to be more advantageous lines along which to make the split, than a mere arbitrary trisection of the alphabet of serials.

First, then, the 1200 most heavily used titles were drawn together, given a separate physical location, and called A store. The journals are arranged as outlined above--alphabetically, with subalphabets at the congested points--and (not unnaturally) they consist overwhelmingly of English-, French-, and German-language publications emanating from the

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*"Current Serials Received by the NLL, March 1967". London, H.M.S.O., 1967. p. vii.

**See Urquhart, D. J., "The Use of Scientific Periodicals" in International Conference on Scientific Information, Washington, 1958. Proceedings. Washington, National Academy of Sciences--National Research Council, 1958. pp. 287-300.

more notable scientific and technological institutions in the western world (The Royal Society, the New York Academy of Sciences, the International Union of Crystallography, etc.). But the only criterion is the size of the demand, and so more popular materials such as Nature, Science, and Scientific American have been included where appropriate.

The stock remaining after the A Store titles were culled has been divided chronologically. A suitable pivot around which to work was the 1959/60 division--the date about which the library became the NLL and started operating out of its new location in Boston Spa (actually, 1961); the time when its purchase and storage of current issues began to assume supremacy over the effort to build retrospectively; and the threshold of a new decade. Therefore, the less heavily used serials (they now total about 31,000 currently received, plus of course the 34,000 or more "dead" titles) are divided at 1 January 1960: all issues from that date to the present are shelved together and called B Store, while all issues up to the end of 1959 are collected into C Store.

The three runs of books, English, Russian, and other languages, comprise D Store; Cyrillic periodicals are known as the Russian Store, and microform stock became F Store. Other collections in the library identified by letters are the Reading Room (Q), the Staff Library (R) and a small restricted section (X). This store location is placed directly after the shelfmark.

Microform materials are best filed not alphabetically but by serial number, of the type that is, for example, allotted to reports on microfiche by the U.S. Department of Defense (AD 123456). They can then be requested simply by quoting that number. If, as is the case with the United Kingdom Atomic Energy Authority, reports are issued in hard-copy as well as in microform, the paper versions are given a shelfmark in the main sequence and stored as serials in alphabetical order after the films and fiches. Any hard-copies which the NLL may generate from its microforms in response to heavy demand, or to loan requests for hard-copy only, are treated identically, so that a partial duplicate set of the report literature (perhaps 10%) in pamphlet form can be deployed with the microcopies. Since so few organizations in Britain other than universities and the major libraries or industrial concerns yet possess the equipment to handle microforms, this section of F Store tends to receive a disproportionate share of the demand.

The remaining principle of storage to be mentioned represents a concession to the world at large, from a library whose founding director has said "we resolved that none of the records should be labelled 'the catalogue'".* The monographic material in the Reading Room (reference books in science and technology) and in the Staff Library (the literature of librarianship and documentation) is arranged according to the Universal Decimal Classification--and there is a card catalogue, which is not, however, maintained with immoderate enthusiasm. A classified arrangement of the reference works and the documentation literature was thought inescapable simply because of the nature of the demand upon them: anyone consulting a reference work, whether it be Encyclopaedia Britannica or the Index Kewensis Planerogamorum, is looking for authoritative factual

*"Some Ideas behind the NLL" p. 2.

information on a given subject--the writer or contributor is almost totally irrelevant. A more detailed discussion of these collections will be given in the section on the Reading Room.

Records

Whatever innovations and economies the NLL may have introduced, no-one would be willing to believe that it could manipulate a collection of 66,000 scientific periodicals growing at the rate of hundreds of titles per annum, without any records at all. Having examined the principles of storage, therefore, we must now consider what records, and what kinds of records, the NLL has evolved to complement the above division of its materials. Obviously, we exempt the purely business records--ordering, purchasing, binding, etc.

Whereas in most libraries the method of storage is conditioned by whichever preexistent system of classification the library adopts, the NLL was free to start afresh--to arrange the stock according to broad types of demand, and to order it in the simplest sequence that would serve the purpose. The records, similarly, rather than being "there because they're there" are generated by need--in the first place, of course, the needs of the staff in responding to loan requests, but in the wider context, the needs of the scientific community as a whole: this is demonstrated by the fact that several of the records are regularly printed up and published, and it accords well with the library's educational mandate--actively to stimulate the use of its collections and to improve the national flow of scientific information.

I heard it once remarked at the NLL that "there is no need for a catalogue--the shelves are the catalogue". And this, if it is not wholly acceptable in theory, is in fact a valid working assumption, in that the most natural way to find out whether or not the library possesses a particular item is to go to the shelves and look. Indeed, for English and other non-Cyrillic books in the loan collection, this is the only procedure available; thus far, at least, the shelves are quite literally the catalogue. Over and above this, a bilingual index of Russian books is maintained, to which all incoming requests (in Russian or in transliteration) which do not include the NLL shelfmark, can be referred. Whole-book translations are also listed here, together with their NLL location. The holdings of these now amounts to over 2,000 volumes: they arrive from an international variety of sources, and many are coming on microfiches or as parts of a monographic series, as well as in book form. We noted above that the systematic acquisition of Russian books had begun in 1957, before the NLL actually existed, and a List of Books Received from the USSR, and Translated Books has been published monthly since mid-1958. Although the library adds its own shelfmark to each entry (since the NLL is the only possible location in Britain for most of the contents) for maximum bibliographic availability the list is arranged "in broad subject groups, approximately in U.D.C. order, subdivided by authors in the order of the Cyrillic alphabet" (from the standing Introduction); the month's intake of Russian book translations follows in the same subject sequence, with authors arranged by the Roman alphabet.

For the huge serial collections, a core of fundamental permanent information is recorded on the punched cards--title, publisher, country, NLL agent, price, frequency, NLL shelfmark etc.--but not a list of issues received. This data is stored on the familiar criss-crossed accession sheets for serials, in looseleaf desk-volumes, where incoming material is simultaneously sorted, stamped, shelfmarked, and batched for the correct store-location, and whence claims are despatched. It is almost certainly quicker to do all this by hand than to try to punch the information onto cards, which would soon deteriorate from daily handling, or reach capacity in some cases every month. (In rural England, the place of origin of the big rubber-edged desk-volumes is distinctly esoteric, so the section which records new serial issues has become known as "Kalamazoo"). However, only the sheet which records the most recent issues--perhaps the last year or two--is kept in its volume; retrospective sheets are removed and filed away en masse in cabinets, which means that for most routine inquiries about holdings, particularly those arising from actual stores work with a requisition form in the hand, the shelf is still the essential place to check first. Since punched cards are a totally impossible medium for minute-by-minute random consultation by a continuous procession of staff members each desiring rapidly one or two brief items of information, the serial titles with their shelfmarks have been printed out from the cards. This Main List, in about 25 volumes, is the working authority for all titles and shelfmarks held to any extent by the library. Title changes are cross-referred by shelfmark, and between printings (seldom more than two years) the list is kept current on a daily basis by the Serial Records staff. In addition to that list, all dead titles which the library has once held are presented more analytically (date of last issue, etc.) on a card index generated from the punched cards, and the hundreds of titles to which the library has subscribed for a short trial period but eventually rejected as "out of scope" and disposed of, are recorded here--any one of them might warrant reexamination in the future. Like the Main List this file is at once in alphabetical and shelfmark order, and can thus be approached from either direction.

An excellent example of the specialized recording which the NLL undertakes is the Conference Index, begun in 1964. This too is maintained on punched cards, from which a working copy has been printed onto filing cards. It is a keyword index, and its original raison d'etre was to enable the staff to keep track of the reports of conference proceedings, which were scattering throughout the library in a multitude of serials, books and microforms; for it had been found that most requests cited a conference without knowing when, or in which publication, the definitive report had appeared--if at all. Naturally prepublication aids such as publishers' announcements, and the Library of Congress World List of Future Scientific Meetings are utilized to the full in an attempt to order in advance any conference reports which are not obviously going to be included in a serial already on order, but if duplication of that particular issue does occur, this is all to the good, since demand will undoubtedly be above the average for that periodical. But placing orders for conference proceedings before the meeting has been held is often fruitless, since changes of content, or policy, or format, or editorial responsibility, can occasion tedious delays (3-4 years is not uncommon) or even nonpublication of the proceedings if, for example, it is decided

that the papers could best be revised and published separately in different journals. So accessibility is difficult even with the recent appearance of a retrospective guide, Proceedings in Print, and the NLL's Conference Index is known to be incomplete. In an endeavour to catch periodical issues containing reports of conferences before they fade into the stacks as undistinguishable units in a serial run, the library's daily intake of some thousands of journal issues is searched, customarily by a student assistant, as it lies stacked on tables for dispersal to the various stores; he is armed with a list of words meaning Conference, Symposium, Congress, Convention, Colloquium, etc. in about a half-dozen languages, and asked to pull those journals whose front cover or contents-page indicates that they contain appreciable reports of conferences (i.e. substantive accounts of at least some of the papers presented--news items are excluded). This informal procedure turns up some 10 or 15 potential new entries for the index every day, or about 25% of each week's total, and as will be only too apparent, it raises the frustrating problem of how much more could be discovered if conference publication were placed on a really firm, international basis. But it is considerably more than any other agency in Britain can hope to accomplish, and lists of the latest acquisitions are therefore printed out from the punched cards and published quarterly as the Index of Conference Proceedings Received by the NLL. This is arranged into two sections, the first according to an arbitrary accession number assigned to each conference report on the same pattern as the former LC card numbers (67-12345), the second a subject keyword listing whose entries refer back via the numbers to the main section. The filing position at the NLL is added, either as shelfmark plus volume and issue number, where the report has appeared in a journal, or as the filing word in the book sequence, or as a report number for microforms. The index has contained citations of conference proceedings in the social science field as from issue number 9 (April-June 1967, some months before the expanded service officially commenced) and the final issue of 1967 provided a cumulative list of all keywords used to that date. About 6,000 conference reports were indexed in that year; the figure is rising by approximately 1,000 annually, and a steady feedback of improved loan requests from borrowers all over the nation--which in turn engenders a better service from the NLL--has more than justified the venture into print.

Other special purpose records are the index by serial titles of translations of individual articles from Russian periodicals (these now exceed 100,000, increasing at almost 15,000 per annum) and the index to the report literature, constructed primarily from the printed cards which often--at least until recently--came with the report. C.F.S.T.I. has now discontinued this service, so the entries from Translations Register-Index (formerly Technical Translations) are photocopied and transferred to filing cards, as are the citations in certain selected indexes of report literature.

The acquisitions list of translations of Russian articles, of which probably a majority of those done in Britain is now sponsored by the NLL, has been published each month since January 1958; first as the LLU Translations Bulletin and later as the NLL Translations Bulletin. This contains also the texts of NLL-translated articles dealing generally with

science and science policy in the U.S.S.R., e.g. "High-speed computers in physical research"; "Efficiency in science"; "Soviet building materials on the world market", etc. As part of this regular section on "Information from the U.S.S.R." the bulletin gives a selected list of the latest Russian books received at the library, each with an abstract. These are drawn from the month's List of Books Received from the U.S.S.R. and Translated Books, with the intention of bringing them before a wider audience and if possible arousing sufficient interest to merit a translation: the introduction to this list stresses that none currently exists, and that the NLL

> will consider undertaking the translation of any of the listed books if it can be shown that the relevant works are of a sufficiently high standard or are of wide interest.

In section two, "Translations Available", arrangement is again by subject grouping, with those papers translated under the NLL's Russian Translation Scheme (RTS) asterisked because, where other translations received can be loaned or photocopied in the normal way, these can be loaned or purchased from the library at not more than 2/6 (30¢) per Russian page. This section gives details of some recently available translated books. The number of translations made from languages other than Russian is as yet fairly small, but by the same token likely to be of substantial significance, and these (both books and articles) have therefore been included in the bulletin since October 1967. Because the NLL Translations Bulletin furnishes not merely citations, but actual texts and abstracts, it is one of the few NLL publications for which a charge is made, presently 6 shillings per copy (approx. 75¢), and distribution is handled by H.M.S.O.

Among the major American indexes of report literature (an explosive growth area which, as we know, is intrinsically unsusceptible to public bibliographic control via the slower medium of printed journals) only a few of the bigger ones, such as NASA's Scientific and Technical Aerospace Reports, or Nuclear Science Abstracts, give serious coverage of British report literature, and these, for obvious reasons, are subject selective. Accordingly, in January 1966, the NLL began to publish its current acquisitions list of British report literature as a monthly bulletin called British Research and Development Reports. This is akin to the List of Books Received from the USSR . . . and the Index of Conference Proceedings . . . in that, by virtue of its being a list of the holdings of the dominant scientific library, it approaches a national bibliography for the material in question (although as far as reports are concerned, commercial and security restrictions forestall any ideas of actual completeness). Again, the only practical source for most items thus indexed is usually the NLL, which is why these publications always give explicit guidance not merely on how to request them, but also on how to apply for borrowing facilities from the library. In this bulletin, additionally, the opportunity is taken of including an annotated address list covering each issuing authority for that month's citations, though clearly the NLL cannot guarantee availability from that source. Since so many reports emanate from government-controlled research institutions, Her Majesty's Stationery Office is probably the biggest publisher and distributor in

the field--which means that, as with U.S. Govt. Printing Office publications, the pricing is unrealistically and amusingly low; U.K. Atomic Energy Authority reports, for example, bearing the country's latest publicly available research into nuclear reactors, a field in which Britain leads the world, can customarily be purchased for the equivalent of 50 or 75¢ each.

British Research and Development Reports divides its citations first into the two categories which seem demanded by the present facts and figures of British report production: I. General, and II. Atomic Energy. Then in each of these, a system of broad subject groupings is once again employed, according to the natural breakdown of the material. The Preface states that "the distribution of titles under subject headings is regarded as experimental--as are all aspects of the Bulletin--and all comments from users will be welcome". In mid-1968 the library adopted the U.S. Department of Defense COSATI List of subject headings for report literature, making some judicious expansions and modifications where necessary to give its specifically military orientation a general applicability to civilian science. The COSATI numbers, of which 2-4 suffice for most reports, are stored on punched cards, allowing an automatic subject search; since the task of assigning numbers retrospectively was completed in January 1969, British Research and Development Reports has, like its companions, appeared in the characteristic format of an automatic print-out, keywords and all.

Finally there is the (divided) card catalogue, already referred to, which records the 10,000 or so UDC-classified volumes in the Reading Room and the Staff Library, and which is situated in the latter. Only the customary brief bibliographic details are given--the catalogue does not attempt to be analytical for the many handbooks and other compilations in these two collections.

Techniques of postal lending

At this point we can begin to answer a very obvious and fundamental question which no doubt has been on the reader's mind since we introduced the attractive but seemingly utopian idea that the shelves of a library could do the work of a catalogue; viz. "If the customary way to check the library's holdings of a particular book or periodical is to consult the shelves, what if the item is on loan?" The reply is that the circulation file, too, has been dispersed onto the shelves.

This is one of the library's most ingenious, daring and successful experiments; without doubt it is only possible because the NLL, being a closed library, can depend upon its shelves being in permanent good order. It obviates the need for a large separate staff called "Circulation Department", condenses the entire lending routine into a single, simple operation, and saves countless hours of time in other ways. It derives from the format of the standard 8 x 5 inch loan request form, and it developed in two stages.

The loan request form, which the borrowing organization purchases from the NLL at a nominal cost to cover average postal charges (roughly

1/9d. or 20¢ per request) is in triplicate; the borrower retains the top copy ("A") and forwards the two carbon copies to the library, which then uses the first of these ("B") as a shelf-marker in the place of the item to be loaned, and treats the second ("C") as a working copy to deal with further processing of the "volume"--either to renew the loan, place a hold on it, or just clear it back into the stacks. The original loan procedure was this: a thin perforated strip containing the borrower's address (as written by himself) would be torn from the bottom of the B copy and placed inside the book or periodical with the C copy that was to be filed, whilst the top 2/3 of the B copy, inserted into a protective plastic wallet, called a "gusset", which remained rigid on the shelf and displayed the flat unfolded sheet, replaced the item on the shelf for the duration of the loan. As the item was processed on its way to the dispatching area, the C copy was removed and filed separately according to the due date and, within that, according to the alphanumerical code for each individual form. Meanwhile, the 8 x 1 1/2 inch strip from the bottom of the B copy, which is itself in two parts, would have been split to form a) the address label for the package and b) a small loan slip to be gummed inside the book or on the front cover of the serial. This slip holds a carbon copy of the borrower's signature, the due date, and the form number by which the item could be correlated on its return with the C copy, which in turn would be matched against the number on the B copy waiting on the shelf as the item was replaced.

This was, even as initially conceived (its origins were of course in the Science Museum Library), a fairly simple, reliable and straightforward arrangement: it gave sufficient security of control over the item while it was away from the library and, since most of the loans returned promptly, the amount of work to be done on the C copies of renewed or reserved material was negligible. But it entailed a completely useless filing routine for the 80% or so of the C copy file which never was needed, and on giving his mind to this uncharacteristic waste of effort, Dr. Urquhart soon realised that nothing would be sacrificed by leaving (technically, "filing") the C copy with the B copy in the gusset on the shelf. Then a much smaller processing file could be maintained by drawing C copies from the shelf only as required by an "overdue" or "hold" situation. Since each returning item already contained the numbered loan slip gummed in a prominent position, the insertion of a C copy, on its journey back to the shelf, was superfluous to identification. Reshelving is rarely a problem at the NLL, especially with the well-ordered sequences of periodicals--all the stores staff had to do was to check a number on the front cover or title-page of an item against the number on the B and C copies on the shelf, additional help coming from the fact that the loan request forms are all colour-coded (for statistical purposes, etc.) according to types of borrowing organization. The shelves are thus a splendidly convenient means of ascertaining, at a glance, whether the library possesses an item and if so, what its current status is. If it is on loan, complete circulation details are right there. A check on the due date, formerly thought of as the final irresistable argument for keeping a circulation-file, is now accomplished by having the gussets colour-coded also, in a cycle of five--red, green, blue, white and yellow--each to be used for two successive weeks. A colour will thus begin its second cycle in the eleventh week; and so, during the tenth, the staff can walk quickly through the stacks knowing that the few

AL 002150

NATIONAL LENDING LIBRARY
FOR SCIENCE & TECHNOLOGY

Copy A | Enter borrower's Code No.

Acta Crystallographica.

21 (1) July 1966, pp. 1-5.

Brown, C. J. "The Crystal Structure of Fumaric Acid."

Microfilm/microfiche/microcard acceptable (see note 6)

PLEASE QUOTE AS FULLY AS POSSIBLE.

} TITLE of book or periodical

} Year, volume, series, issue number, page numbers, etc.

} Author of book or article and/or title or subject of article

Borrower's Reference Copy.

Please keep this, and send the other two copies to:—

The Loans Department,
National Lending Library for Science & Technology,
BOSTON SPA,
Yorkshire.

Dr. J. Smith,
Dept. of Chemistry,
Univ. of Manchester,
Oxford Road,
MANCHESTER.

ADDRESS SPACE

(1) *I hereby undertake to conform to the regulations*

(2)* *I declare that this publication is required only for purposes of research or private study*

* *Please delete (2) if it does not apply.*

3/8/68. J. Smith by P.T.

DATE SIGNATURE

PLEASE CHECK THAT OTHER TWO COPIES ARE COMPLETE & LEGIBLE

51-8162 H.B. Ltd. 7/68

Figure 3. Loan Form.

AL 002150

NATIONAL LENDING LIBRARY
FOR SCIENCE & TECHNOLOGY
Boston Spa, Yorkshire

Copy B | Code No.

Acta Crystallographica.

21 (1) July 1966, pp. 1-5.

Brown, C. J. "The Crystal Structure of Fumaric Acid."

Microfilm/microfiche/microcard acceptable

For the use of the Science Museum Library

TITLE NOT IN	PART NOT IN	ON LOAN	AT BINDERS

SHELFMARK

Not in NLL

Try ScML

Selection

Not immediately available
Please return this form in ____ weeks if still required

Dr. J. Smith,
Dept. of Chemistry,
Univ. of Manchester,
Oxford Road,
MANCHESTER.

ON HER MAJESTY'S SERVICE

ON LOAN FROM THE NATIONAL LENDING LIBRARY FOR SCIENCE & TECHNOLOGY
Boston Spa, Yorkshire
Please return as quickly as possible and not later than date shown below.

3/8/68. J. Smith by P.T.

AL 002150 Date

Figure 3 (contd).

1 2 3 4 5 6 7 8 9 10 11 12

AL 002150

W WLR RI R2 DUE

Copy C

SHELFMARK

Vol. | Part | Pages | Year

REPLY WHEN PUBLICATION NOT SUPPLIED

Item not available from N.L.L.

Not eligible for passing to ScML

Passing to ScML

Not available from ScML

Acta Crystallographica.

21 (1) July 1966, pp. 1-5.

Brown, C. J. "The Crystal Structure of Fumaric Acid."

Dr. J. Smith,
Dept. of Chemistry,
Univ. of Manchester,
Oxford Road,
MANCHESTER.

NATIONAL LENDING LIBRARY FOR SCIENCE & TECHNOLOGY

Borrower's Declaration:

(1) *I hereby undertake to conform to the regulations*

(2) *I declare that this publication is required only for purposes of research or private study*

3/8/68. J. Smith pp P.T.

Figure 3 (contd).

isolated gussets of (e.g.) red represent long overdue items, and can be pulled for checking, thereby clearing the shelves for a new sequence of red gussets.

The precise chronology of this imaginative development is unknown to me, but it was used in B and C store at least in early 1967, when the extensive remodelling of B store was finished; A store adopted the new system in January 1968. Incidentally, this system works equally well for microform stock--the B and C copies are just folded into the cabinet space vacated by the tin of film or by the fiche, and the drawer closed.

The other side of the basic retrieval procedure at the NLL is the physical factor of transporting the literature. The buildings are spacious in floor area, though none, as yet, are more than two storeys high; they stand apart from each other, joined by corridors approximately 10 feet wide; and the loaned materials must all be packed for mailing, then consigned to the Post Office vans at a rate of up to 150 sacks each day, whilst, elsewhere in the library, a comparable amount is pouring in. A decision quickly made was that packing and dispatch should be centralised--to spread the work among the various stores would be to contravene a sacred tenet of industrial efficiency. And in many respects, this is what the library is--an industrial enterprise, engaged in mass production. Dr. Urquhart says

> we have, in the NLL possibly a unique example of an attempt to apply the principles of the industrial revolution to library activities. We have tried to use the concepts which are common in the industrial world and you may very well go away with the impression that the NLL is more a factory than a library. This result would not dismay me.*

--an industry in terms of techniques, though not a business in terms of goals: obviously the profit motive has no part in this analogy, for the use of this immense public resource is entirely free save for the basic postal charge mentioned above, which is recovered when the borrower obtains a book of loan forms. The optimum use of so far unstinted public funds, and the intellectual aim of serving the scientific community and thus the nation as a whole, are the high incentives. From the very first, after all, the sine qua non of the whole venture had been speed--a nationwide lending service working with industrial efficiency. So the next step after choosing an appropriately central location for the packing area, was to ensure a fast and steady flow of literature from each of the stores. Junior assistants pushing book-trucks were clearly out of consideration; expert advice was sought, and the result was a conveyor system to travel around the stores and past the packing bay.

Here, as before, it did not all happen at once; they proceeded experimentally, with the two collections whose needs were exigent--the top-priority Russian store and the heavy-use material comprising A store. These were housed in adjacent buildings linked by a corridor at each end, with the packing bay occupying a corner of one of the buildings. A belt

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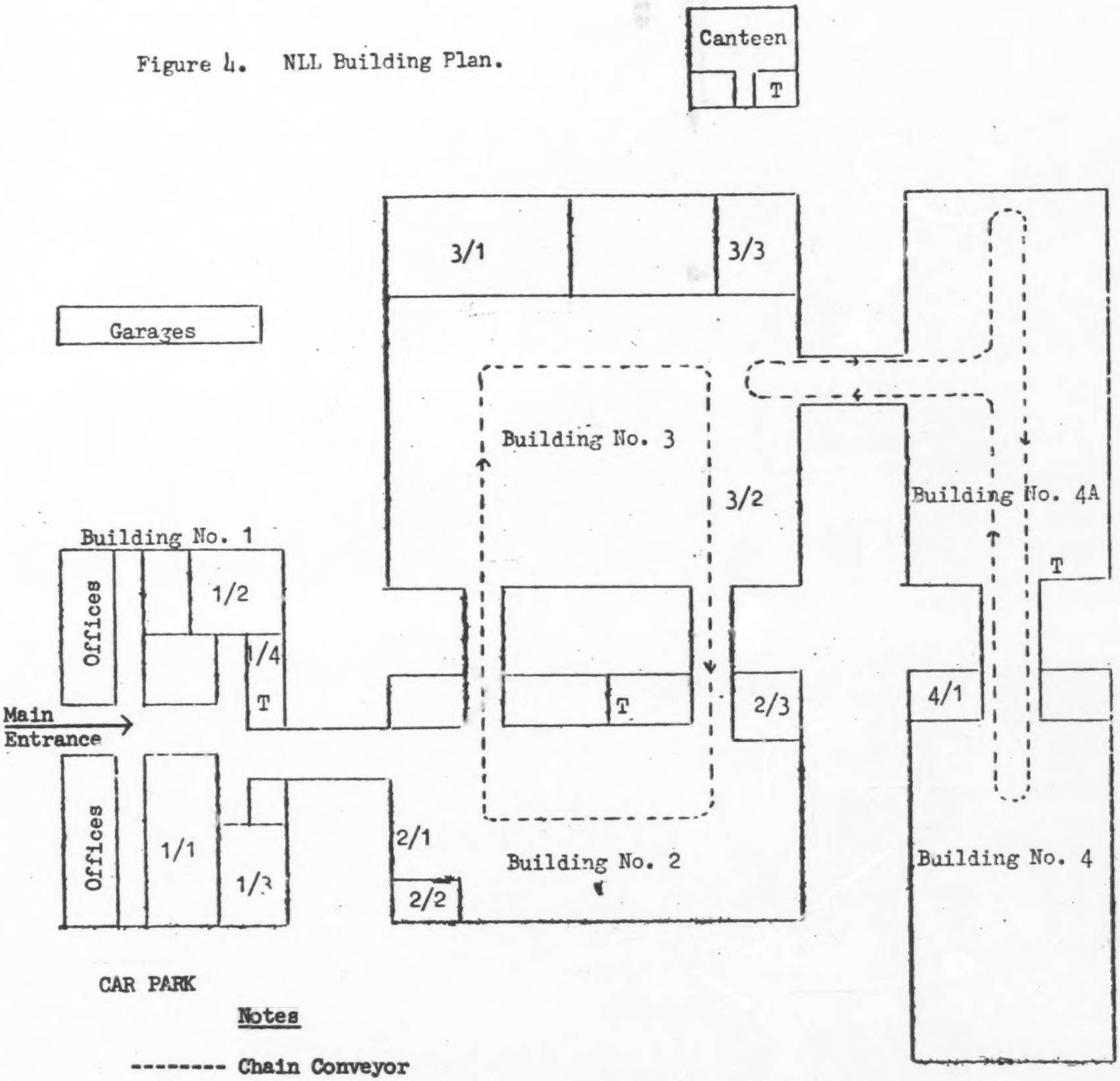
*"Some Ideas Behind the NLL" p. 10.

conveyor was rejected because it would deny access from one row of stacks to the other one across the aisle in each store, and because the literature would have to be lifted off a moving belt and carried to the packing tables: instead, an overhead chain conveyor was installed, with shallow book-trays slung beneath it at chest height every twelve feet or so, like ore buckets at a mine. The sturdy plastic trays are carried on a rigid metal frame with an electrically operated tipping-mechanism which releases the tray (noisily) down a chute and into a siding for the packers. An empty tray is then placed in the frame as it begins the circuit again. The trays travel at 60 feet/minute, which allows people to walk between them with safety, and they move in one direction only--thus, from the packing area, the conveyor goes clacking down a corridor into one end of the A store building, turns 90 degrees to travel along the broad central aisle between A store stacks, gathering material as it goes, swings 90 degrees again to exit from A store at the far end and, via the other corridor, reenters the first building. Here it passes successively through the Russian serial stock (Cyrillic on one side of the aisle, translations on the other) and the book collections, English and Russian; books in other languages, together with the hard-copy duplicates of micro-materials, are stored in a room directly behind the main stacks, within easy reach of the conveyor. The trays move slowly along the length of this building, and so back to the packing bay, a total rectangular path of 700 feet.

The tipping mechanism is set by the person who first deposits a batch of loans on the tray: inserted through the carrying arm which descends from the overhead chain (the stem of an inverted Y) there is a vertical row of metal plugs, one of which must be pushed--or from the opposite side pulled--to protrude about an inch beyond the rest (Fig. 5). At the dispatch point this activates a switch controlling an armature that tilts the base of the frame sideways and down, and the tray slides out. If the plug is not set, the empty tray glides unhindered through the scaffold. When the conveyor was being designed, it was thought wise to provide five dispatch-points along the circuit, hence a row of five plugs. This was done in case further packing areas became necessary, and possibly also with the idea of using the conveyor for moving returned loans back to their store locations; everything was essentially experimental. In fact, the trays have to be used almost exclusively for the day's outgoing loans; but when B and C stores became equal partners in the library's operation, the existence of these dispatch-points meant that a packing location convenient to all could be established without trouble.

For the first five years of the library's life, this conveyor served the purpose admirably. Meanwhile, the decisions had been taken that would divide the less-heavily-used periodicals at 1 January 1960, and work began on remodelling and refitting the building that was to become B store. As the size of the B and C store collections has grown, at about 3,000 titles annually, so has demand increased (until it now equals that upon A store) and these stores too have been equipped with a conveyor system, a sophisticated version of the original. B store is connected by corridor to the packing bay in the building which houses Russian serials and the book collection, but C store can be reached only

Figure 4. NLL Building Plan.



CAR PARK

Notes

-------- Chain Conveyor

Building No. 1

1/1 Public Reading Room
1/2 Staff Library
1/3 Russian Records
1/4 Telex

Building No. 2

2/1 Receipts Area
2/2 Copyflo Room
2/3 Conference Room

Building No. 3

3/1 Microfilm Room
3/2 Packing Bay
3/3 Lecture Theatre

Building No. 4

4/1 Machine Recording

T - Toilets

through the farther end of B store; both have a mezzanine. The new tray-conveyor, therefore, starting at the packing bay, moves off in an opposite direction to the old conveyor, along the corridor into B store at ground level. Its locus is roughly a block T-shape: in B store it turns 90 degrees left, serving the ground floor stacks in that half of the store, then ascends to the mezzanine (the frames have been articulated at the bifurcation of the inverted Y, so the trays remain horizontal) and progresses along the whole upper length of B store. It then comes swinging down again, and through the corridor from the interior of B into the end of C; here, since the volume of business is now uniformly small, and since the structure of the building would have made installation a disproportionately difficult matter, the conveyor travels just a few yards to collect material; book-trucks and the service elevator are still feasible in C. It then turns back on itself and reenters B store at the ground floor, to cross the other half of the store; when it meets again the junction of the T it takes a path along the other side of the corridor to emerge at the packing bay, dump its trays in the same manner as the first conveyor, and then turn through 180 degrees to recommence. Both conveyors travel at the same steady speed of 60 feet per minute, or 2/3 m.p.h., but the new one has an even larger length, 900 feet, giving a maximum time of 15 minutes for delivery of material from the stores.

The B/C store conveyor has three dispatch points built into the circuit, and all are in use: one at the packing bay; one in B store itself, which, unlike the original group of stores, does some of its own processing; and one in C store, which has become the catchment area for the thousands of gussets, holding "dead" B and C copies of the loan request form, which are daily pulled from the shelves as their loans are returned.

With neither system does the staff need to worry about keeping together a batch of items for one borrower; if a single tray will not take all, the next empty one to pass will serve, because over the years the NLL has found it a great deal faster, and thus ultimately cheaper, to pack each item separately regardless of destination or size.

The library has adopted other measures besides the introduction of a standard pre-printed requisition form, in order to take fullest advantage of its fast retrieval procedures and of the postal service. A mimeographed hand-out, "Notes on Loan Procedure" is sent to every new borrower, laying out all the steps to be followed in requesting a loan. Assuming that the borrowing organization has been enrolled, has purchased its pad of requisition forms, etc., the essential fact it is asked to understand is that, for excellent reasons, the NLL is far more strictly compartmentalized than the ordinary library, and that there is absolutely no alternative to doing everything in the manner specified by the library if the borrower is to get an efficient response from the system. This is an aspect of life in a modern social organism instinctively recognized by most Americans as necessary for the best service to the greatest number, but it is not so easily admitted in England, especially in relation to learned libraries, with their long history of club-like privacy and personal service. Thus, loan applications "should not contain any other correspondence" . . . "on no account should new requisitions be sent with returned loans" . . . "The costing of the Loans Service takes into

account that a proportion of requests will be unsatisfied. Therefore under no circumstances can request forms be used more than once even when the original request is not satisfied"--this last is to cover incorrect, illegible or otherwise mutilated requests, and requests for material not held (for whatever reason) by the NLL. The borrower is informed on the C copy which is returned promptly to him: the B copy is retained so that the form cannot be used again, and in case further action is warranted by the library (e.g. an attempt to purchase the material). When the item is correctly identified, but temporarily unavailable, the borrower is always notified immediately: if it is out on loan or at the binders, a postcard is sent, and the application held in waiting at the library; if the item has not yet been received (and such requests, made deliberately in advance of the publication date, affect a large percentage of the A store periodicals) both copies, B and C, of the requisition are returned to the applicant with a suggestion as to when he should reapply.

"Since the majority of the stock . . . is held in separate parts, a separate requisition must be submitted for each item", even if this means two, or 7 or 8, consecutive numbers within the same volume of a periodical. The library could not realistically have hoped to mount a loan service of this magnitude by relying on the traditional method of buckram-binding back issues, with perhaps an entire year in one physical volume. The reader of scholarly periodicals takes as his unit the article,* not the whole issue, and certainly not a year's issues. (Dr. Urquhart, as a colleague of S. C. Bradford, fortunately had known this corollary of the Law of Scattering early enough to make it part of the structure of the NLL). The library therefore aims to meet this need as closely as it can. Despite the conclusions of the Royal Society Scientific Information Conference of 1948 (Recommendations 3.1 and 10.5) that libraries have "a special responsibility" to do so, it was economically impossible for the NLL to deal in individual papers, so it maintains its serials in their single-issue format.** Of course, considerable quantities of the back sets that were bought on the second-hand market or extracted from the Science Museum Library are bound in the traditional bulky five or six pound volumes; and if the NLL purchases multiple copies of a periodical, it will as a rule have one copy buckram-bound, simply to ensure the permanence of the collections--though it is firmly established that for postal reasons, no buckram volume bound by the NLL is to weigh over 2 1/2 lbs., and that it must open flat to permit photocopying. But the heaviest demand invariably occurs before the first year of publication has elapsed, and so in 1957 a Research Association was commissioned to determine how best the issues could be bound individually, quickly, relatively cheaply, and in a format that would stand the rigours of repeated postal lending. The result was a flexible binding, in cloth-lined card on the back and clear polyvinyl chloride sheet on the front;

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*What Ranganathan has finely called "nascent micro-thought". Five Laws of Library Science. Bombay, Asia Pub. House, 1963 edition, section 832.

**Much of what follows is drawn from Miss R. M. Bunn's detailed consideration of the factors involved in the NLL's binding operation, "Binding of Periodicals in the National Lending Library" J. Doc. 18 (1) March 1962, pp. 20-4.

this is done commercially, takes only 1-2 weeks, and has proved outstandingly durable. The transparent cover eliminates any need for lettering on front or spine and makes for speed and ease of handling at the shelves. Since most periodical issues thus bound will slide trimly into a manila envelope, they require no elaborate packaging, and can be sent letter post, which is generally quicker than parcel post. Initially the cost was 2/6d per part (30¢) which has now levelled off at about 2/4d (28¢). As Miss Bunn points out,

> The overall cost of the issue binding is not, therefore, very much greater than the cost of binding the material in buckram volumes in the more traditional form . . . in many cases because of the extra availability of the items bound in this way, one copy is sufficient to meet the loan demand where two would be needed if the material was bound into volumes. (loc. cit.)

For new issues of a major journal, however, even 1-2 weeks is an unacceptable delay; so since the NLL almost invariably takes at least two copies of these, one is routed directly to the binders from the accessions department, whilst the rest go to the shelves for immediate use, to be bound either in buckram or as a second softbound copy, at a later date. The weight restriction on buckram volumes causes even these to approximate more to part-bindings than to traditional annual tomes--often two or three issues will constitute the maximum that can be bound together. Miss Bunn also states that

> Indexes which are published in separate issues are not single-issue bound. They are shelved unbound in an open-ended box at the beginning of the periodical run to which they refer. Subsequently they are bound together in a buckram volume in either five- or ten-year groups according to their size. (loc. cit.)

--this for the compelling reason that indexes, no less at the NLL than in libraries with a more complex recording system, are a crucial bibliographic tool, in daily use by the staff, and are therefore very seldom loaned out, especially since a photocopy will in most cases suffice.

A further aspect of the part-binding operation which should be noted here concerns the absence of lettering; this is an advantage in that it saves time, and about 90% of the cloth-bound spines are in any event simply too thin to accommodate eye-legible print to be displayed horizontally on the shelf. But it might have led to massive confusion, had not two safeguards been adopted: from among a run of perhaps thousands of issues,

> it was felt that the time to find a required part might be considerably increased and also that there might be a tendency to mis-shelve parts when replacing them after use. This difficulty was overcome by using different colours for the cloth-bindings of the spines, according to the year of publication of the journal. This colour is the same for all titles in any particular year. A five-year colour cycle was introduced . . . (loc. cit.)

--consisting of red, blue, purple, green and beige cloths, which normally are interspersed with buckram sequences on the shelves. Hardbound volumes do of course have lettering, including the date, so that there is little chance of a purple binding from one five-year cycle finding its way into another. Nevertheless, there still remained the threat of careless mis-shelving among the parts, which might number anything from 2 to 52, of any one year. Instead of minuscule lettering, therefore, a broad black diagonal line is drawn across the spines of a completed volume, from the bottom of the first issue, upwards at 45 degrees: most years have one, or possibly two, such lines (if the volumes are semi-annual) and any disorder is thus visible at a glance.

The NLL hand-out on loans procedure also sets forth the conditions governing the loan period: initially this is three weeks, from the library back to the library, transit time included (this is rarely more than one working day in each direction). The library asks that the item be returned in less than the three weeks whenever possible, and in general the scientific community cooperates very amicably with this request--it seems to be tacitly understood that scientific and technical information is still a scarce and expensive commodity, which it is in the national interest to distribute to the maximum. There is, however, an automatic extension period of another three weeks when no other borrower is waiting. This is granted without any further paperwork, and on the understanding that the borrower will then return the item immediately if a recall notice is sent. After the two periods of three weeks, the publication is overdue and the library asks that no further extension be requested. Borrowing privileges from the NLL are, almost without exception, worth so much to the participating institution that it is unwilling to risk their curtailment through failure to comply with the regulations. If an item is lost by the organization's own client, or whilst in transit, the organization accepts the full financial responsibility. But these are limit cases, and on the whole the system functions smoothly and with noticeable goodwill on all sides.

A small percentage of loan requests, mainly for old [illegible]ic books, is forwarded directly to the Science Museum Library; if [illegible]ary then loans the item, the NLL naturally requests that it be ret[illegible]ere, and not to the NLL--in this way the services of two national co[illegible]ections are coordinated for the borrower's benefit, and long, repetitious delays avoided. No request can be accepted in the form of a letter, or by telephone, but the library does offer a teletype (Telex) service for urgent requests, on certain conditions. First, each request has to be spaced out on a separate section of paper, 5 inches long, so that this may then be processed by the library as a standard loan form. Second, the borrower too must treat a teletype request as one loan form used, otherwise teletype requests would be circumventing the postal charges covered by the price of loan forms, and must therefore include the serial number of one unused form and agree not to use that form, or its number, for any other request. Third, the full postal address must be repeated for each item: the library can then rapidly type out an address slip without tediously consulting files, etc. Many institutions which have become regular teletype users now reciprocate the library's courtesy by supplying it with batches of their own address labels (the NLL encloses such labels with every loan it issues), which in turn allows them to substitute

their brief telegraphic address on the requests and save money on long-distance phone lines.

At present, a heavy week sees some 1,300 requests teletyped over the three machines, which must also cope with the library's own outgoing messages. Furthermore, the percentage of loans requested by teletype (and supposedly therefore needed urgently) has been rising steadily--the 1967 total of 45,477 represented 7.7% of the year's requests. This is suspiciously high for an area as small and densely urbanized as Britain, the more so in view of the really outstanding service offered by the ordinary postal procedure, and the huge jump in cost (approximately five-fold) involved in teletyping. And it is true that the system is being incorrectly used. To catch the evening mail, any request has to be received in the library by mid-afternoon, say 3 or 3:30 p.m.--it will then arrive at the borrowing institution on the following day, which, particularly for organizations in outlying areas, is often quicker than taking a trip to the nearest large metropolitan library. But the teleprinters continue to spew out scores of requests--sometimes until 6 or 7 p.m. and at weekends too--which cannot possibly be issued any faster than they would have been by the normal postal routine. Part of the increase in usage is the predictable concomitant of the library's overall growth, and the NLL has reserved another ten lines on a new exchange now being constructed. Parkinson's Law seems to imply that messages will increase (regardless of the time of day) to fill the teleprinters available.

About the NLL photocopying service, much could be written concerning problems of copyright, etc., but this essay is essentially descriptive in purpose; suffice it to say that, by common agreement, research workers traditionally regard the fruits of their investigations, once published, as public domain, and that the NLL shares with most other libraries the strong conviction that given fair and reasonable usage, photocopying is a normal, sensible, and logical extension of library service. "Fair and reasonable usage" sanctions the provision of one copy to a borrower in lieu of the manual transcription the borrower would, in a past age, have been constrained to make; this follows closely the recommendation of the Royal Society's 1948 conference. Even on the standard request form for a postal loan, the borrower's signature attests that the material is needed "only for purposes of research or private study" unless he specifically deletes this declaration. If he does, the library will not refuse to supply a book or journal, but it cannot then exercise its option to send a photocopy instead.

This option is utilized in good faith according to the familiar set of factors that confronts every inter-library loans librarian. As we know, the NLL has pioneered new methods precisely in order to ensure that its collections are bound and stored in such a way that the document itself can be loaned--this is the avowed primary aim of the library, and this is where the overwhelming incidence of demand occurs. But when, for example, the borrower wants only a brief, specific excerpt of less than 10 pages from one of the older, heavyweight volumes of bound periodicals, the loan of which would deprive the library of a full year's issues for perhaps six weeks, as well as incurring steep postal charges for both parties, it is no more than common sense to send a photocopy. This

applies *a fortiori* when a bound volume of an abstracting/indexing or other reference work would otherwise leave the library's possession merely on account of one single-line citation, or one abstract, *etc*. The loan form also provides for the borrowing organization which lacks microreading equipment to delete a section which says "Microfilm/microfiche/microcard acceptable", whereupon any reasonable loan request for material which the NLL holds only in microform is supplied in photocopy. "Reasonable request" assumes not more than 10 pages of microfiche enlargement, or 20 pages of microfilm enlargement, or one report on microfiche or microcard; if the request substantially exceeds this, a note is dispatched asking the borrower to forward extra loan forms *pro rata*. (If the borrower *will* accept microfiche, he can usually have it to keep free of charge, since the cost of duplicating fiches at the NLL is now negligible). Full-size copies of reports thus generated from microforms are strictly on loan--when they return they are shelved in the hard-copy annex to the microform store against future demands of the same type. Loan requests which may have to be supplied in a photocopy because of the rarity or fragility of the original are generally the province of the Science Museum Library, since none of the NLL's stock is allowed to come into this category.

Above and beyond this discretionary substitution of a photocopy for the original document, the NLL does operate a photocopying service on a straightforward fee basis. The request form is one which the Science Museum Library has been using for many years, 8 x 5 inches and in triplicate; the cost is 5 shilling per 10 page unit (a book of 50 forms is priced at 10 pounds); and the declaration of *bona fide* study or research is mandatory, not optional. One form must accompany each unit requested, and the photocopy routine takes about the same time as that for postal lending--i.e. a request mailed on Monday arrives at the NLL on Tuesday, the material is retrieved and sent the same day, and reaches the borrower on Wednesday. Literature to be photocopied is removed from the shelves in the usual way, with one copy of the form left in a gusset in its place: it is then photographed on a 35-mm sequential camera, after which the developed negatives are enlarged and converted into full-size xerox prints in a single operation, by means of a Rank-Xerox "Copyflo" machine located near A store. The NLL was one of the first agencies in Britain to acquire a "Copyflo"; in fact I understand the library purchased its machine before the Rank-Xerox Corporation had fully appreciated its potential and instituted a "rental only" policy. It now works almost to its capacity of 12,000 pages a day, consuming in the process 8,000 feet of paper (i.e. 7 1/2 miles per week) at 20 feet/minute; its time is divided about equally between the 1,300 photocopy requests per week and those loan requests which the library elects to photocopy instead. As of the beginning of 1969 there are "914" type copiers installed in each of the other three main buildings--B store, C store, and the area housing both the Book collection and the Cyrillic serials collection. These are to meet a rate of increase in photocopying demand which is presently well above that for loans: at the same time, they contribute to enhanced efficiency per item photocopied--first, by reducing both processing time and handling labor, which enables the literature to return to the shelves far sooner; and second, by permitting short-term switching of the workload, which eliminates any temporary low quality output or delays due to maintenance problems. (See Appendix 1)

The provision of photocopies has thus far been the NLL's only international service, apart from its publications.* Two rates of payment are currently operative, one for Europe, and a slightly dearer one for countries outside Europe. Actually, neither fee is much greater than the domestic rate, allowing for additional postal charges. To expedite overseas requests, payment is made by means of pre-purchased coupons affixed to the request form, at the customary ratio of one coupon per ten pages of xerox copy or microfiche enlargement; or per one report on microfiche; or per 20 pages of microfilm enlargement, which is cheaper to provide since the library does not first have to photograph the document. The material is dispatched, usually within 24 hours of receipt, by first-class mail to Europe or air-mail to other countries. Already this service is becoming noted for its speed, and, so I was told, has on occasion been exploited by customers in the U.S. who could not obtain their desiderata from an American library in comparable time, though the biggest demand naturally stems from Europe and the British Commonwealth. Over 22% of the requests for a photocopy of literature in the NLL collections now comes from outside Britain.

It may perhaps be appropriate to close this section by watching a typical loan request as it travels the full circuit; this will serve to draw together in sharper focus many related facts and procedures which have perforce been scattered into various compartments of the essay so far.

After the morning's mail has been opened and sorted, the loan forms, in two copies, B and C, are taken to the Serial Records office, where a staff of about six marks the B copy of each with a store location, using the Main List where necessary. A working-list of A store titles has been printed out from the punched cards, and these are in any case frequently the easiest to recognize. Any other serial title will be in B or C stores according to date, except for the Russian titles which are separate. Requests which are plainly or possibly for books go to D store, whilst most reports are housed in F. At this point, a store-by-store count of the forms is taken and the statistics sent daily to each section. These requisitions are then conveyed immediately to the various stores, where they are sorted alphabetically and distributed among the stores staff. One of the NLL's less successful innovations (but still an experiment worth making) was a system of pneumatic tubes, such as are frequently seen in department stores, by which to transfer requisition forms in canisters from one part of the library to another. With the first post of the day there are so many forms to send to the various locations that it is quicker to deliver them in one batch by hand, and during the rest of the day there are so few that the expense of operating the system is not justified, and these, too, are therefore delivered by hand. Furthermore A store, to which almost 50% of the requests are destined, happens to be directly adjacent to the sorting office.

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*The library has recently decided "to start lending material to some of the main libraries in Europe when photocopying is inappropriate" (D. J. Urquhart, letter to Author, April 1969). By its making the decision to lend dependent upon whether or not a photocopy would be feasible, the normal sequence of priorities has been imaginatively used in reverse to solve a specialised problem.

To issue a publication the stack worker takes it off the shelf, tears the long thin strip from the bottom edge of the B copy and rests it between the pages of the document. Leaving the body of the B copy (marked with the due date) together with the C copy, on the shelf in a gusset of the colour being used that week, he takes the loan to the end of the stack and puts it on a passing tray, remembering to set the metal plug. Any loan requests which he cannot identify are sent back for checking, which is done as a separate operation, customarily by the head of the store on the same day. On being ejected from the conveyor, the loan is processed by sticking onto the front cover or title-page the loan slip, stamped with the due date; packed, with the remainder of the B copy strip acting as the address label; franked; thrown in a sack, and collected by the mail vans which call at the library four or five times daily. On its reentry--to another part of the library--the publication is returned to its store, checked against the waiting counterfoils and re-shelved, whilst the gusset is routed to a disposal area in C store to be emptied and re-circulated. The "dead" B and C copies are then burnt. If the loan has not returned before the tenth week, its coloured gusset is pulled from the shelf and given to the Loans Office, whence the requisite postcard and/or letter will be sent to the borrower. The second letter carries a warning that borrowing facilities might be suspended. If another request arrives whilst the item is still on loan, the stack worker tells the office staff this simply by clipping to the new request the C copy of the present borrower; he then leaves a marker flag in the gusset. What usually happens then is that the loan is reissued immediately upon its return, and the stack worker receives the old C copy with a new gusset which he substitutes for the first one. Literature which is to be photocopied is requested on a similar form and is treated as a loan which happens to return the next day.

Personnel Structure

From the conspicuous absence in all of the foregoing of any mention of the "librarians", and from the persistent and deliberate choice of such expressions as "graduates", "stack worker", and "stores staff" it will already have become apparent that the NLL possesses a markedly idiosyncratic personnel structure for a library; perhaps apparent too that this comprises not only scientists who have had no traditional library training, but to a surprising extent people without a higher education of any kind. Also, it should always be borne in mind that, the NLL being an agency of the national government, its employees are members of the British Civil Service.

We can make a broad distinction here between employees whose function in an organization is directly tied to the special mission of that organization, and employees who perform all the essential services needed to run any corporate activity that operates on its own premises. There is a total basic work force of about 225 people at the NLL: taking the latter group first, we have i) staff concerned with the physical plant, and ii) clerical and other employees ancillary to the unique work of the organization. The first category comprises cleaners, porter-messengers, security guards, maintenance staff such as electricians, boilermen, etc., food services staff, and packers. These employees presently number 39;

they are paid on an hourly basis and are known as "the Industrials".* The other support staff--secretaries, typists, payroll and accounting staff, general office and switchboard staff, and welfare officers--totals 20 people.

Those of the staff holding positions specifically connected with library operations are members of the Scientific Civil Service. This part of the personnel structure of the NLL has evolved through the process of fitting the unique work to be done there into the relentlessly stratified administrative categories established to serve many aspects of government scientific work, from coal-mine research to veterinary inspection to nuclear power station design to Whitehall desk work to scientific documentation. If you specialise in any one of such occupations at what the authorities have decreed is a comparable level, you will be given a fixed designation and a fixed salary scale in the good civil service manner, with promotion into another category dependent as a rule more upon formal than experiential qualifications.

There are three such categories in the Scientific Civil Service: Scientific Assistant, Experimental Officer and Scientific Officer. The first is a general, basic designation for employees having a high school education and perhaps one or two years beyond (e.g. by means of Adult Education classes in the evening). The nature of the other two groupings may be clarified by comparing their equivalent names in the parent organization, the Civil Service proper--respectively they are Executive Officer and Administrative Officer. Within each category, there are of course successive grades. A man can be in turn Scientific Assistant and Senior Scientific Assistant, but without a degree or equivalent he cannot achieve what is revealingly known as "Class-to-Class promotion", although he may be receiving more money as a long-serving Senior Scientific Assistant than a young Assistant Experimental Officer will be paid at starting. And that same Assistant Experimental Officer can rise steadily in rank to Experimental Officer and Senior Experimental Officer, but to transfer laterally to the administrator class (Scientific Officer, Senior Scientific Officer, Principal Scientific Officer, Chief Scientific Officer and so on) generally requires high academic credentials in one's field. Alternatively, an exceptional wealth of practical knowledge and experience within the system might possibly qualify one, though in the Civil Service a person simply cannot rise on that basis to anything comparable in status to the positions he or she might attain in the business world. In either case, an interview with the Civil Service Commission may be the critical factor.

In the Civil Service proper it is still comically true that the higher one rises, the more important his old school tie becomes, but the social and economic imperatives of the modern industrial state have fortunately freed the Scientific offshoot of that kind of irrelevance. Since the latter's staff structure was taken over from the parent body, however, it

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*One may be pardoned for wondering why the well-bred Whitehall bureaucracy which conferred this designation on them did not just say what was on its genteel mind and call them "the rude Mechanicals".

is perceptibly the same feudal system, with the distinctions between the classes sedulously blurred by a complex overlapping salary arrangement, and by catering to that trivial preoccupation in contemporary Britain with pompous job-titles, where it is apparently essential to one's human dignity to be called a "Head" this or a "Senior" that. Any layman overhearing someone say "I'm Principal Scientific Officer at the NLL" might reasonably go away with the impression that the speaker was its top official--but as it happens, that is the grading of the present deputy Director, while, with a strange irony, the Civil Service designation for the man who actually does direct some major scientific undertaking for the government, such as a nuclear power station or a biological research establishment or a National Lending Library, is likely to be Deputy Chief Scientific Officer--I gather that Whitehall reserves the rest to itself. All in all, the whole bureaucratic edifice bears lamentably little relation to library science or documentation, and it is hardly surprising that the NLL staff tries to ignore the official labels as much as possible, and pay attention instead to a person's actual role in the library's operation.

Of the 227 persons currently employed at the NLL then, 168 are in actual library work.* This figure comprises 37 in the Experimental and Scientific Officer classes, 89 Scientific Assistants, and 42 other people occupied in library related tasks--clerical assistance, photoprinting, machine operating, etc. Most of the fundamental shelf work in the stores is done by Scientific Assistants; in their ranks are scores of young people who have just completed high school, some of whom are pursuing further academic qualifications--only about 4% of the country's youth go straight from high school to university in Britain. The library gives generous financial help with fees, and time off work with pay; those who attend night classes receive hours of study time during the working day, and those enrolled in daytime further education courses are allowed one day per week. The NLL even runs its own courses in Russian, for the benefit of those working with Russian material. In addition, there are invariably three or four graduates who are candidates for library school, working for a year or so as Scientific Assistants, as I did. They are rotated through as many departments as time will allow, shown all aspects of the library's activity, answered with professional candour when they approach the senior staff with questions, invited to sit in on occasional seminars during which future developments at the library are discussed (e.g. facsimile transmission), and assigned a variety of interesting tasks such as assisting in a user survey, collating entries from selected abstracting and indexing publications to demonstrate differences in time-lag and coverage, compiling handouts and updating publications, classifying reports, and serving visitors.

The heads of stores or processes or sections are usually Senior Scientific Assistants or Experimental Officers--on them falls most of the responsibility of practical day-to-day management--and a nucleus of graduate scientists (including 6 Ph.D.'s) is concerned with the intellectual

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*Figures current to April-May 1969 (Dr. D. J. Urquhart and Miss R. M. Bunn, letters to Author).

operation of the library as a whole; they can be said to be the professional staff, the documentalists and the administrators.

Whilst a position at the NLL certainly carries a lot of respect and prestige, my impression is that it is not easy to advance from there to anywhere else. The NLL environment is a unique and exhilarating one, where it is accepted as routine that the library is the national leader in its field, and that what its professional staff have to say is important to the library world as a whole. They are constantly in motion, giving lectures to professional groups in science, industry and librarianship, at home and overseas; undertaking surveys; organizing courses; publishing their researches, and so forth--the NLL, as may be easily imagined, is an excellent laboratory in which to work. But much of what they do there can only be done there, and would prove irrelevant to any other organization. Are they librarians? They do not often think of themselves as such, and no other library in the country is remotely like the NLL. Are they documentalists? But similarly, there is no other agency in the country which tries to do what the NLL does, using the broad approach it uses; for most scientific documentation work is formidably specialised in scope, and one of its endemic preoccupations is precisely what the NLL has shunned--classification. Are they Civil Servants? Again, they do not think of themselves primarily in those terms: no other government body could adequately use their NLL experience, and they cannot just float around within the bureaucracy of their particular government department, as their counterparts (in rank) in London can. But this is by way of speculation, and it must be said that the NLL has not yet been in existence long enough to meet this problem in an acute form. B. C. Vickery is one internationally known documentalist who has found a path: from the NLL to one of its larger academic clients, the library of Manchester University's Institute of Science and Technology (often regarded as Britain's M.I.T.) and from there to the Research Department of Aslib, which he heads.

Almost every non-temporary employee of the library is a member of one of the four staff organizations which take place of unions for government personnel; for scientific civil servants this is customarily the Institute of Professional Civil Servants.

We may complete this review of the personnel structure by looking at the library's financial situation. The NLL is paying for its literature what any other library would have to pay--the figure is presently about 270,000 pounds annually. But instead of the personnel and operating costs soaring way above this by a factor of three or four, and affecting the costs per unit issued proportionately, the library still requires substantially less for salaries than for purchasing the literature. For 1968/69, the estimate was 225,000 pounds. Appendix 2 gives some comparative costs for staff and for acquisitions in the other national libraries of Britain.

The twin reasons why the NLL has been able to achieve a ratio that no other major library in the world has really come close to, are first, the library's emphasis on simplified techniques of storage, recording and retrieval--especially the elimination of cataloguing. These provide

a recurrent saving in themselves, and also directly produce the second factor, whereby 131 of the 168 people occupied in library work are non-professional staff. Obviously these are not mere transient coincidences on the economic scene; rather they are fundamental to the body of theory which is making the NLL work, and thus they are likely to be continuingly effective. It is the enduring character of these operating efficiencies in the library's economy that has led Urquhart to point out that

> if you make a simple cost benefit analysis on the NLL, you find that the total unit cost per item supplied is not only less than that of other libraries, it is falling.*

The Reading Room**

The NLL has had a Reading Room since its inception, in order to be able to extend to any member of the public, whether he be attached to a borrowing organization or not, reference use of its collections. For the most part, the Reading Room has so far served scientists and technologists in local industries and local universities--some need one or two facts (e.g. a specification, a translation of a technical term, a single abstract), others come to read a whole sequence of papers, or to stay abreast of the current literature of their subject. Recently the spreading fame of the NLL has encouraged visitors from all parts of the country, who spend anything from an afternoon to a week working in the Reading Room. Mindful of its comparatively isolated geographic situation, the library has been particularly anxious to assist those who wish to make use of its resources in person: in addition to furnishing explicit directions and even timed itineraries therefore, it will upon request arrange accommodation; and it invites every visitor to avail himself of the staff restaurant for coffee-breaks and the midday meal.

The Reading Room, which has 26 seats, holds a concentration of indispensable reference tools: a central "island" stack contains the monographs arranged in U.D.C. order, whilst abstracting and indexing periodicals, bearing shelfmarks according to the overall alphabetic sequence, are shelved on four stacks which stand perpendicular to one wall, forming three reading bays. A selection of guides to reference literature, some of them the library's own publications, is displayed on a large separate table, and the Reading Room also possesses readers for film and fiche. The one external wall of the room is window along its entire length and up to the ceiling at about 15 feet. This area is for most of the daylight hours flooded with an abundance of strong natural light from a flamboyant rural sky, and the five reading tables have been placed along that side; the interior half of the Reading Room, which adjoins the library's entrance hall, always needs artificial light. It is staffed by two Scientific Assistants, one of whom is often a graduate trainee librarian.

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*"The Library User and his Service Needs" by D. J. Urquhart, in Research into Library Services in Higher Education. London, Society for Research into Higher Education Ltd., 1968. p. 5.

**Substantial parts of this section derive from a staff paper written while I was working in the Reading Room, January-April 1968.

The importance of reference literature in such a library as the NLL is, of course, paramount: it is both a part of the total literature on a given subject, and, more especially, the instrument by which the main collections are serviced and deployed. The NLL could purchase it on either account, but undoubtedly treats it more as the latter than the former. The Reading Room collection is placed there for the convenience of visitors, but as is true of the reference stock in many a modern library, the staff are the primary users. Every day brings its quota of garbled, incomplete and otherwise confused requests, for which some elucidation is sought from the reference tools before they are returned to the borrower for checking. The trouble stems in large measure from the interposition of a scientifically untrained secretary or stenographer between the researcher, whose intentions she must transmit, and the library staff.* The borrower then receives either a request for more information, or the publication with a note pointing out that the NLL has had to amend the original citation in order to supply what was apparently required.

The library receives a steady flow of requests for the postal loan of reference materials--both monographs and serials. The general policy, based on the principle that the library's whole raison d'etre is to provide the maximum possible lending service, is that the NLL shall allow reference literature out on loan whenever it reasonably can. There are to be no sacred cows at the NLL, and the overuse of the "Reference Only" label on book spines was one of the habits which Urquhart, having criticised it in others, was particularly anxious to avoid. This policy of flexibility has found expression in a series of linked arrangements.

First, the library meets all requests for the loan of a brief, specific excerpt (e.g. a single abstract) with a photocopy. Second, Reading Room stock consists only of the most necessary reference materials, and therefore is kept continually up-to-date--by now it needs no stressing that one of the prime factors bearing upon the usage of scientific information is its recency. This means, for example, that apart from such titles as Chemical Abstracts, most of the reference serials in the Reading Room are recent issues. In some cases only the latest complete year plus the current year's issues are kept, with the rest sent to B and C stores; in others, all issues back to 1 January 1960, with the balance in C store. That portion of the set housed in the stores is of course available for loan. Third, there might be a complete second copy in the stores: some years ago. in connection with the courses it began to offer on scientific and technical literature, the NLL amassed a basic selection of the abstracting and indexing publications in English. This was loanable en bloc to participating libraries for periods of up to six months as a contribution towards the task, in which both parties had

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*But the error is not always clerical. It is by no means uncommon to see loan forms blandly asking the library please to send its "Science Citation Index" or "Gmelin's Handbook", and Dr. Urquhart often remarks to visitors that two of the most heavily demanded titles in the NLL are "Private Communication" and "In Progress".

an equally high stake, of stimulating a demand for scientific literature such as the NLL could supply. At the same time, Urquhart and the NLL were hoping that the presence of an entire collection of major reference works in a library would persuade its staff to reexamine their holdings with a view to subscribing to more of these publications themselves, thus easing the pressure on the NLL's reference stocks. To a large extent this has indeed happened, and the collection is now not as often in circulation. It is shelved in Section X, the caged area, and is a considerable asset as a backup collection of crucial abstracting and indexing tools. Fourth, many publications which are works of reference as regards their format and function are not even put in the Reading Room--the Book collection contains monographic bibliographies and review publications, etc., whilst A, B and C stores hold over 2,000 "reference" serials available for normal loan. Thus it is no more than a small fraction, the most obviously indispensable reference tools, such as current issues of broad area abstracting organs or big multivolume compendia, which have to be permanently excluded. Fifth, any reference work might be withdrawn temporarily from circulation, for example while a course is being given at the library. But as a rule this lasts no more than a month or two, and the gentle but persistent pressure of demand ensures that a temporarily restricted item is subject to early reassessment.

All in all then, there is a better than 50-50 chance of a loan request for reference material being supplied by a loan. This arrangement works tolerably smoothly and seems infinitely preferable to the traditional policy--traditional in the worst sense--of a rigid doctrinaire refusal to part with works because they are "For Reference Only".

The Reading Room visitor can obtain material from the stores by filling out a requisition form at the service desk, whereupon an assistant disappears into the stores for 5 or 10 minutes and retrieves the items personally. There is actually a conveyor belt, installed when the Reading Room was being created, for the transfer of stock to and from the stores: it was thought that, used in conjunction with the above-mentioned pneumatic tube system, an automatic delivery of readers' requests would provide a fast service at no effort to the Reading Room staff. But the pneumatic tubes proved unsuitable, and the belt itself is regrettably slow, short, badly sited, and expensive on electricity. For the small amount of retrieval to be done it was not worth disturbing the Reading Room hush with its distracting intermittent noise, and the assistants have so far managed to do the work more efficiently by walking to the stores and carrying items back by hand. But there are clear indications of a rate of increase in Reading Room usage that will shortly preclude this--at which point the library may be better advised to augment the staff rather than reactivate the conveyor belt. The requisition form is the same size as the standard postal loan form, in order that it may function as such on the shelf when the document is withdrawn, but has a different design of compartments and is coloured a distinctive blue.

A logical extension of this service which it was thought would be appreciated by those who must make a considerable journey to consult NLL holdings, was to give the regular visitor a supply of these requisition forms, so that he could mail them to the library two or three days ahead of his next visit; they could then be fed into the system as loan requests

to be delivered to the Reading Room. This would obviate the often lengthy business of repeated personal retrieval for staff, and would enable the visitor to collect all his literature at the desk upon arrival; furthermore, the library might be able to save the patron a fruitless journey, for it undertook to notify him if much of what he requested was going to be unavailable on the day of his trip (on loan, at binder's, not yet received, etc.). Unfortunately, the "Advance Notice" scheme is still surprisingly under-utilized--as of mid-1968, not more than 30 such requests were being processed in a month. Remembering that the stores are dealing in terms of 3-4 thousand loan items a day, it is obvious that the extra burden upon the main retrieval system would be inconsequential even if the library received 30 a day. A visitor from Manchester, on his first trip to the NLL, spent three days in consulting 70-80 items from the stores--5 or 6 citations at a time, which would lead him to request 5 or 6 more, and so on; this compelled the Reading Room staff to neglect various of their other daily routines for the whole of that time. Given two books of "Advance Notice" forms, he was able to return some weeks later and accomplish the same volume of work in two days, without unduly disrupting service to other visitors. The percentages of time and effort that can thus be saved for staff and patron alike are potentially enormous, and as personal usage of the library continues inexorably to increase (working visitors to the Reading Room now number over 150 a month) it is probable that the Advance Notice scheme--originally, like so much else at the NLL, an experiment--will become the normal procedure for regular Reading Room users to follow. I know of no other library which offers a comparable service.

The next development was also a matter of manifest common sense. Some of those who came to work in the Reading Room were, not surprisingly, already attached to a borrowing organization. As the matter stood, any such patron who, after scanning through various journals at his table in the Reading Room, decided that he really needed to have them out on loan, was constrained to return to his institution and submit a straightforward postal loan request for the items, by which time they might well have been loaned elsewhere. Those visitors who were in a position to do so would even bring their organization's book of loan forms to the library, and make out postal loan requests on the spot for the documents they had selected for retention: true, they were thus wasting the money their organization had paid for postage of that material, but this was a minimal sum, and it was more than worth it just to be sure of keeping their hands on the information once they had got it. The NLL therefore initiated the "Sponsored Borrower" scheme, by which it officially recognized that there were circumstances when personal lending was in order. The essence of the plan was that the NLL would honour the credentials of anyone authorized by a participating organization to borrow from the library on its behalf; the full responsibility for material thus borrowed would remain with the organization, which would undertake to return loans by post in the normal way unless, of course, the individual chose to pay another visit to the NLL on or before the due date and return them in person. Some locally based researchers now do this regularly, in order to increase their chance of catching the latest literature before it goes out on postal loan. Borrowing institutions were supplied by the NLL with numbered "Sponsored Borrower" cards which could be issued indefinitely or

for a specified period. A case in point would be the library of a nearby university, which could furnish faculty members with the first type and graduate students with the second. Loan forms, as was mentioned earlier, are colour-coded; the black-printed version is the one sent free of charge to other government agencies using the NLL, and this was now made available in the Reading Room to anyone producing a valid and current "Sponsored Borrower" card. There was no charge, because the patron himself was conveying the material to his office. The B and C copies of the completed request were then routed to stores with instructions to the staff to shelve this loan form in place of the Reading Room requisition that had been left there by the Reading Room assistant earlier in the day, and the A copy was promptly forwarded to the institution sponsoring the borrower, so that it could maintain a detailed record of who was borrowing what in its name, and when it was due back.

This mode of usage is now an established feature of the library; it has improved its flexibility and enhanced its appeal, and not merely to patrons in the immediate vicinity but to those in cities up to 150 miles away. All that remains is to devise a way to mitigate the tedious penalty of double paperwork for the sponsored borrower who decides, after filling out blue forms for Reading Room use of perhaps a dozen documents, to convert each of them to a regular loan.

Small-order photocopying is also available to visitors upon request, though the procedure is somewhat cumbersome; here too, the library is still tending to treat the individual who comes in person as merely a version of the organization which is served by post--and an overseas organization at that, for reasons at which one can only guess. When a patron makes an over-the-counter request to have a photocopy of something he has been reading, he must first fill out the standard triplicate form (a separate form is required for each request) then give the assistant five shillings for up to ten pages, and pro rata. The transaction requires the assistant to walk down the corridor to the Accounting section; to formally purchase from the government a coupon, affixed and endorsed by the NLL cashier; to obtain an elaborate handwritten receipt; and then to go into the depths of the stores to execute the order on one of the library's "914" machines which happens not to be in use--and that may not be the first one he comes to. Clearly, for one unit of photocopying, which means 90% of the orders, the cost to the library in time, labor and paperwork is out of all proportion to the sum of money involved. Coin-operated photocopying machines are still in short supply in Britain, and they invariably provide an inferior copy; so rather than make an admission of failure by installing one in the Reading Room (where it would constitute a disturbance) the library would do better to give some thought to improving the present service, for demand upon it is mathematically certain to increase. For instance, Reading Room staff could handle the whole financial transaction. Having decided a few years ago that personal usage of its facilities was after all acceptable, the NLL has yet to fully comprehend that one man coming to the library in person cannot simply be plugged into a gigantic production system designed to attain efficiency at the industrial level. Undoubtedly its Civil Service heritage is helping to perpetuate paperwork, but at least the NLL's basic approach to its task does encourage the modification of its

procedures whenever the fulfillment of its intellectual goals requires it; for too many libraries in Britain the procedures are so time-hallowed that they have come to determine the goals.

Together with practising scientists pursuing their research, the NLL is now receiving growing throngs of visitors from the library world--in particular, librarians attending courses in the use of scientific literature, and groups of library school students. To them, and to any other visitor with a special need for material on documentation, the resources of the Staff Library are made available as a courtesy. In fact, at the discretion of the Staff Librarian, requests for postal loans will be granted; for the NLL, now possessing the biggest such collection in the North of England, has become a significant professional asset both for the practitioners of documentation and librarianship, part of whose responsibility is to help their clientele to use the NLL's scientific collections, and also for those engaged in teaching these subjects in colleges and universities--of whom, however, there is still an acute shortage in library schools and a total dearth in the academic departments of universities.

The Staff Library, like the Reading Room, has both serials (in the standing NLL sequence) and monographs (U.D.C.), shelved in distinct areas. The emphasis is naturally towards the librarianship of the sciences, and scientific librarianship: guides to publications, in particular, fast-appearing serials like the British National Bibliography, upon which the library relies heavily for the selection of recent British books; organizational and personal directories; some full-length biographies pertaining to science and to documentation; British university calendars (i.e. annual catalogues); works on library management and administration, and machine assisted documentation; and a strong collection of technical dictionaries in many languages. Conspicuously absent are book catalogues or other lists of the holdings of other libraries, for the NLL is characteristically the ultimate stage in inter-library lending, not a regional link on the way to larger libraries. If the NLL and the Science Museum Library acting as one, cannot supply a science or technology request, it is about a 95% certainty either that the item is not available anywhere or is "out of scope" and should have been sought through other channels.

Russian Translating Program

Reverting once again to that incalculably momentous event in human affairs, the launching of the first man-made earth satellite, we have seen that one of its immediate repercussions in Britain was a wholehearted effort by the government to ensure that a comprehensive national collection of Russian scientific and technical literature be amassed and rendered widely available without any more delay. The newly conceived National Lending Library for Science and Technology was the natural agency to receive this commission, and to that end the Lending Library Unit began, and the NLL has continued, to pay special attention to the acquisition both of original Russian documents and of all known translations. As part of this latter side of the problem, the NLL was simultaneously given the responsibility for organizing a drastically enlarged government program of sponsoring, coordinating, publicising and generally

stimulating the translation of significant Russian material not otherwise available to the English-speaking world. Before the NLL itself had come into being, Urquhart had used surveys done by the Lending Library Unit to highlight this national deficiency. Regarding holdings of Russian scientific literature, he found that

> all libraries in the country only contain about 49% of what is currently available, and the libraries which lend between them only hold 39%.*

From a simple and direct questionnaire to researchers, the following picture emerged:**

Can you read French	--	Yes--80%
Can you read German?	--	Yes--60%
Can you read Russian?	--	Yes-- 2%

The three prongs of the program are books, serials and individual papers.

The translation of an entire book being always a costly venture, the library's publicity on "Translations Services at the NLL" asks anyone requesting the NLL to undertake one, to be sure they can demonstrate "that there is no English equivalent (my emphasis) of the book and that the translation would fill a definite gap in Western knowledge". However, the NLL itself, with its all-embracing acquisitions programme and its close professsional surveillance of abstracting and indexing publications in all fields of science, is often in a better position to know firmly whether a translation exists or not than is any single group of scientists or documentalists. As we have seen, it works on this assumption in the NLL Translations Bulletin by publishing its list of recent Russian books and by stressing in the standing Introduction thereto that as far as is known, no translation currently exists, and that the NLL will consider arranging for one if the work is "of a sufficiently high standard", or failing this, then at least "of wide interest" because it fills a definite gap. My understanding is that none of the actual translating is done in the library; for books, as for separate articles, the NLL employs "a panel of extramural translators who have scientific as well as linguistic qualifications". The translated works, currently numbering 6 or 7 books per year, are then issued by the library either as xerox or offset litho copies, by which means the prices are held down to about 17/6d ($2.10) for a document of 100 to 150 pages, or 100/- ($12) for most

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*"Some Functions of the National Lending Library for Science and Technology" by D. J. Urquhart. Library Assoc. Record 59 (6) June 1957, pp. 203-06.

**"The Library User and his Service Needs" by D. J. Urquhart, in Research into Library Services in Higher Education. London, Society for Research into Higher Education Ltd., 1968, pp. 1-6.

volumes of 400 pages and up. They are also available on loan. Over and above these,

> the NLL also cooperates with commercial publishers in producing book translations. The Library provides an edited translation and the publishers have responsibility for printing and distributing, etc. In return for this cooperation, the NLL receives a proportion of the accruing income. ("Translations Services at the NLL" - handout.)

--these comprise another 14 or 15 books annually: in general, they are those titles for which an appreciable demand is anticipated, and where the commercial publishing industry can utilize its selling methods. The NLL's own publishing efforts are directed towards works which, whilst not likely to be in wide demand, are nevertheless considered worthy of translation.

The NLL's program of sponsoring regular cover-to-cover translations presently encompasses no fewer than 16 Russian serials: these journals are published issue by issue as complete translations of the corresponding Russian originals. No time was lost after the planning and budgeting of the enterprise had been settled during 1958, and publication began with the Russian issues for January 1959 of six journals, followed quickly by another six that year, four more in 1960, one in 1961 and one in 1964. (Two titles, rendered as Industrial Wood Processing and Russian Review of Biology, have since ceased publication, but copies of what did get translated are still available from the NLL). The translation, printing and distribution of the periodicals is carried out by learned societies, research associations and commercial publishers, all of whom have special competence in the particular subject and facilities for worldwide dissemination. Three of the more important titles in chemistry, for example, are translated by The Chemical Society (Russian Journal of Physical Chemistry, Russian Journal of Inorganic Chemistry and Russian Chemical Review); Automatic Welding and Welding Production are handled by the British Welding Research Association, whilst the Macmillan Company produces Russian Mathematical Reviews, and the Pergamon Press Thermal Engineering. A full list, together with the agencies responsible for translating and disseminating the journals, is given as Appendix 3. The prices range from about $20 to about $100 per year (the 1967 devaluation may have caused minor adjustments) and there is a special cheap rate on 11 of the 16 titles for the libraries of universities and technical colleges, foreign as well as domestic. Older back issues can usually be purchased from the respective agencies at a reduced price.

Also begun in 1959 was the third segment of the upgraded programme: the translation of individual Russian articles. These will be arranged free of charge for any organization, not only those on the borrowing list of the NLL (though most already are), in response to specific requests. The requester is asked to comply with a set of basic conditions: first, the article obviously cannot be from any journal scheduled for a cover-to-cover translation. Second, the requesting organization agrees to edit the rough draft for the library, if called upon to do so: the final version is then duplicated for general distribution at not more than

2/6d. per Russian page, with a free copy going to the requester. Third, the article should be preferably not more than two years old--otherwise, though it might be eminently valuable to the requesting body, it will probably be of diminished interest to everyone else. However, an older article may still be accepted if a sound reason can be given--"needed for specific research and not available in English" is considered to be an adequate reason in most instances; but (fourth) it has to be understood that any translation requested of the NLL "should be of more use to the requester than just 'of interest'". Fifth, the original Russian text must be readily available, either as part of the NLL collection or submitted by the requesting organization in three photocopies (or the original from which such photocopies can be made at the library). Sixth, the NLL reserves the right to refuse a request on the grounds that the document is too long; and seventh, the translation is for the private use of the institution, not for publication. All these may sound unduly restrictive, but in point of fact a serious request meets most of the conditions as a matter of course. Almost 5,000 important papers have been made available to the British scientific community--and thus, indirectly, to the American--through this project, and the library is currently being called upon to sponsor about 600 such translations per year.

The total annual cost of the translating program, now in its 12th year and flourishing, is running at about 210,000 pounds, of which approximately 145,000 pounds is recouped by sales: by far the biggest slice of the budget is for the cover-to-cover serials, which account for 150,000 pounds annually, with about 90,000 recovered.

It should also be mentioned that the NLL sends monthly details of its translations work to the S.L.A. Translations Register-Index (formerly Technical Translations) and has established with Aslib in London a coordinated referral service for translations from all languages. Whilst the enquirer may contact the NLL direct--by teletype if necessary--to find out whether a specific Russian translation is held there, the records of its translations are also incorporated into the British Commonwealth Index of Scientific Translations, a union list, of which the U.K. copy is maintained by Aslib in its capacity as "the central checkpoint for the U.K. at which persons or organizations can ascertain whether a given article has been translated and, if so, the source from which . . . it can be borrowed". (NLL handout--"Availability of Translations"). Any loan request to the NLL for a Russian translation which the library does not in fact possess is referred forthwith to Aslib as an enquiry about the existence of that translation in possible other locations. Any organization which prepares or commissions translations is urged to send details thereof to Aslib and, if possible, to donate to the NLL a copy of any which are done from Russian. In keeping with the recent expansion of coverage, the library has begun to accept requests for translations of Russian periodical articles in the social sciences.

A few years ago Dr. D. N. Wood of the library surveyed the translation effort* and found that whilst the demand for Russian material was now largely under control, the identical problems of ten years ago were

*"The foreign-language problem facing Scientists and Technologists in the United Kingdom--Report of a recent survey" J. Doc. 23 (2) June 1967, pp. 117-30.

were now arising with respect to Japanese. No centralised and systematic scheme of translation and dissemination was in force, and very, very few of the scientific community could read the language for themselves, yet there was a growing awareness of the urgency of gaining access to new masses of important scientific work. He therefore recommended broadening the scope of the Translating Service to include Japanese, and the Dainton Committee gave this suggestion its endorsement (para. 419). Action should follow in due course.

Looking at its translations in toto, the library estimated in mid-1967 that it held about 120,000 scientific papers translated by British agencies; convincing testimony to the energy with which it has carried out its mandate.

The Educational Campaign

The national scientific community which forms the NLL's clientele can be broadly trisected into government, industry and universities, with the public library and the research association (or learned society) standing as smaller elements at the fringes; for their members, when it is a question of borrowing from the NLL, are often members first of one of the three central types of institution.

When the library came to begin active preparations for courses in the use of scientific literature (which was just as soon as its collections were judged to be sound enough in all fields of science to permit it) it considered, quite accurately, that the point at which the total absence in that community of any provision for a formal academic training in the systematic manipulation of scientific literature started to prove seriously detrimental was the graduate school. It was from here that government, industry and universities all drew their top scientists, and they were being sent out in their thousands with a deplorable gap in their professional competence: inadequate or incomplete information leads to inferior work, which in turn becomes inferior information for someone else--and Britain, more than any other Western European nation, has been investing vast sums of government money in its scientific and technological researchers. The NLL's first courses therefore, were for groups of graduate students in various scientific disciplines.* They lasted for 2-3 weeks, and were organized on the then somewhat novel premise "that scientific literature does not comprise a miscellaneous collection of papers, reports and books, etc., but that it can be subdivided into quite basic and fundamental categories" (loc. cit)--which was something that Urquhart had been stressing, largely unheeded, for years.** They attempted, that is, to teach the structure of scientific literature and the associated documentation services. For most participants, to come to the NLL and use the

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*The full account of the genesis of NLL courses is given in "Courses on the Structure and Use of Scientific Literature" by D. N. Wood & K. P. Barr, J. Doc. 22 (1) March 1966, pp. 22-32.

**See for example his contribution to Conference Document #61 of the Royal Society Scientific Information Conference, 1948. (Report and Proceedings, p. 694.)

biggest scientific collection in the country was a profoundly revelatory experience; the practical work was guided by groups of NLL graduate staff, and the plenary lectures and discussions concentrated upon the literature of science as a whole. One of the especially pleasing results of the courses was the heightened, even exhilarated, interdisciplinary awareness of the students:

> an engineer found useful material in Leather Abstracts; a physicist discovered more references than he could cope with in Chemical Abstracts, and a biologist went away insisting that his department should purchase World Fisheries Abstracts. (ibid)

A more sobering fact was that "at least one person in each course found he was duplicating work which had been done elsewhere" (ibid), in one case with potentially disastrous consequences, for the results had been patented. The last course advertised that year attracted 160 applications for 20 places, and with that, as Wood and Barr point out, everyone concerned became finally convinced that the information failure was too general, too "built-in" to the system, for the NLL to rectify it alone, and that the real responsibility for providing a methodological training of this kind lay with the universities.

The library then decided to alter its line of approach, and to try instead to reach those upon whom, in default of any formal academic instruction in documentation for science graduates, the burden chiefly fell--the scientific staff of university and technical college libraries. Here too, many participants discovered aspects of the scientific information scene that they had not known before; their professional knowledge of libraries and the publishing industry that could now be taken for granted by the NLL organizers was more than counterbalanced by the need to equip each librarian with the tools to answer abstruse bibliographical problems in all of the sciences and technologies, not just his special area. Accordingly, they were given lectures on the nomenclature of the chemical and biological sciences, for example, and four full days were allotted to a series of comprehensive literature searches, for which the NLL graduate staff had formed themselves into three subject-oriented syndicates (chemical, physical and biological sciences) and had constructed batteries of multiple-part questions, the answers to which required an ability to wield scientific reference literature on various levels--abstracts, indexes, fast announcements, review serials, technical dictionaries, translation indexes, etc. The following was typical:

Physical Sciences

Question 3.

a. What is palaeomagnetism?
b. Discover an English language review on palaeomagnetism published since 1960 and give full bibliographical details.
c. Discover as many papers as you can that have been written, since the review, on the subject of palaeomagnetism and its bearing on the hypothesis of continental drift.

d. Have the Russians been working on the subject of palaeomagnetism and continental drift, and if so give references to at least two post-1960 articles and discover whether either or both have been translated into English. If translations exist give bibliographical details.

Once again, the first course was a notable success, and was repeated several times, with the result that participants often went home to organize their own courses for their university's graduate students in science. Always happy to cooperate, the NLL thereupon agreed to send a staff-member to assist, or to make special 6-month loans of sets of reference literature, as and when requested. In April 1965, the library organized a one-day nationwide meeting on the teaching of the use of scientific literature, to assess progress to date and to lay plans for the future. By general agreement, the NLL's role thereafter was "to teach the teachers"--to run courses at the library

> both to introduce the participants to the literature and its guides and to show them how similar courses could be run in their own universities or libraries.*

--and in 1967 two courses were arranged for university library staff (31 attending); two for university faculty (28) who have of course been increasingly anxious not to miss the training their graduate students were beginning to get; one for public library staff (15), especially those in the large metropolitan systems like Manchester, whose technical library has to be virtually of university standard; one for academic research workers in the social sciences (22); and one for teachers in library schools (11), which as yet mostly offer only undergraduate courses. In addition, four two-day symposia on chemical literature were held around the country, for instructors in technical colleges and their college librarians, at which NLL staff delivered the lectures, and towards the end of the year another meeting of those concerned with teaching the use of scientific literature was arranged at the NLL.** This seemed to confirm that though regular departmental courses are still some way distant, a recognition is gradually spreading of the basic modern necessity of a systematic formal training in the documentation of one's subject--ideally, a compulsory course of about ten weeks during the undergraduate period, perhaps arranged cooperatively between two or three academic departments in a broad disciplinary area like the biological sciences. This is another reaction which the NLL can take credit for having catalysed.

In 1966 the library became the U.K. agent for the NLM MEDLARS computer retrieval scheme, which, as it retrieves not documents in the library but bibliographic citations for a searcher, who may or may not subsequently ask the library to provide the documents thereto, is a computerized parallel to the NLL's own published indexes and literature-use

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*NLL Progress Report, 1967 (not for publication)

**See the report by D. N. Wood in Library Association Record 70 (1) January 1968, p. 78.

courses, and potentially one of the library's most powerful tools in its nationwide effort to stimulate the transmission of information. The programme is run in conjunction with the Computing Laboratory of nearby Newcastle University, using an English Electric KDF-9 computer to search the tapes. The NLL's part of the operation is to publicise the service and teach its correct applications, to accept and process all requests, and to supply the enquirer with the results. To acquaint medical scientists and librarians with the service, the library has organized a three-day "appreciation course"; during 1967, the first full year of operation, 6 of these were held for 80 prospective users. The supervisor of the service, and liaison officer with the NLM, is presently Dr. A. J. Harley, who after an extended preparatory visit to Bethesda in 1966, returned to establish MEDLARS in Britain, for which he has written U.K. MEDLARS information retrieval service: a handbook for users, published by the NLL.

At present the service is free of charge to U.K. clients, and available at cost to certain European customers. Requests are processed in batch mode. The 1967 total was 1365 searches, although the weekly average in the last two months of the year was about 35 (equivalent to over 1800 p.a.) which promised a substantial increase as the service became better known. The typical product is a bibliography of about 150 references. By the end of the first year of operations, the NLL could attest that the searches were making a noticeable impact; that the highly popular introductory courses were proving invaluable as user education; and that the MEDLARS phenomenon as a whole had actually helped to quicken the use of traditional printed guides to biomedical literature. The comment of Glyn Evans is worth repeating here:

> I think it fair to say that until comparatively recently, many American librarians have not had the opportunity of a detailed course in MEDLARS such as has been pioneered by Dr. Harley and his colleagues at the NLL.*

The NLL's courses on literature-use, the MEDLARS service, the busy schedule of conducted tours, and the speaking and lecturing engagements of the professional staff (now international in scope) are complemented by a vigorous and diversified publishing effort, several items of which have been discussed in appropriate sections above. This is designed not merely to publicise the holdings of the NLL, but to bring before the widest possible public some basic information on scientific literature and documentation that is otherwise not readily available, an aim which is hopefully promoted by the policy of issuing publications free of charge wherever possible. The official publications of the library are:

Monographs

Current Serials Received by the NLL. London, H.M.S.O., March 1967. 432 p. Revised about every two years.

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*Reviewing U.S. National Library of Medicine: Evaluation of the MEDLARS Demand Search Service, by F. W. Lancaster, in J. Doc. 24 (4) December, 1968, pp. 321-3.

A List of Current Serials Received from Asia. Boston Spa, NLL, Aug. 1967. 48 p. Gratis. Drawn from the above.

A KWIC Index to the English Language Abstracting and Indexing Publications Currently being Received by the NLL. 3rd edition, Boston Spa, NLL, Jan. 1969. 24 p. Gratis.

UK MEDLARS Information Retrieval Service--A Handbook for Users. Boston Spa, NLL, July 1966. 63 p. Gratis.

The National Lending Library for Science and Technology. Boston Spa, NLL, March 1967. 16 p. Gratis. Illustrated brochure.

Serials

NLL Translations Bulletin. (monthly) H.M.S.O. 6/- per copy.

List of Books Received from the USSR and Translated Books. (monthly) NLL-gratis.

Index of Conference Proceedings Received by the NLL. (quarterly) NLL-gratis.

British Research and Development Reports. (monthly) NLL-gratis.

Films (16mm., sound, colour)

"At Your Request" (16 mins.)

"Science by Post" (5 mins.)

On a smaller scale, the library has compiled about 30 handouts, some of which are intended to provide guidance on how to use the library:

"Notes on Loan Procedure".
"Translation Services at the NLL".
"Services available to visitors".
"Subject Coverage of the NLL". etc.

--while others contain more general information about scientific literature and the guides to it:

"Some Data on Biomedical Literature".
"Useful Titles in the Field of the Physical (Chemical, Biological) Sciences".
"Guides to Guides to Scientific Literature".
"Report Series and Indexes to them". etc.

--a further group presents some useful material on documentation:

"Equipment for Handling Microfiche".
"Sources of Information on Equipment".

"Patterns of Information Search".
"Guides to Sources of Information". (lists institutions as well as publications) etc.

The handout "KWIC Index to some of the Review Serials in the English Language held at the NLL", with over 525 citations (14 p.) is probably worthy of formal publication, as one of the very few guides to the burgeoning field of review publishing ("Advances in . . . ", "Progress in . . . " etc.). Copies of all the library's no-charge publications are displayed in the Reading Room and the visitor is encouraged to avail himself thereof; by this channel the library knows it is reaching the research scientist or engineer himself, and not merely an institution.

Conclusion

It has been the chief purpose of this essay to describe as fully as possible the creation and the operation of a major postwar library, and to set it in the wider context of new libraries for the later 20th century. Part of the NLL's success was seen to stem from the fact that while it has accomplished a lot, it has not tried to do too much--it has looked afresh at methods of library service, it has instituted radical reforms in the area of record-keeping, it has set up a "production line" of industrial dimensions for retrieval, it has exploited microforms and xerography. But it is still perforce a library designed primarily for paper documents with eye-legible print, and must plan to continue on that basis for the indefinite future; the 60 acre site was acquired with this in mind, and by 1970, when B store is destined to reach capacity, another store for shelving the scientific periodicals of the decade 1970-80 should have been built, probably with a similar tray-conveyor system. There will have to be certain modifications however, for the next building will be the first that cannot be situated in the original cluster--the land reserved for it is on the other side of a public road. This store therefore, will have to have its own set of records, its own postal input-output, and its own Reading Room, unless a long umbilical connection can be constructed, aerial or subterranean, with an exceptionally fast book-moving apparatus. Closed-circuit television, even with remote control xerography, might be explored as a means of preserving one central body of records for the whole library. But looking farther ahead, there will undoubtedly have to be additional stores on that side of the road, so perhaps the library would be best advised to start a whole new colony, with the eventual aim of giving it substantial operating autonomy.

Yet another possible consideration is that usage of the material which presently almost fills the original buildings will have so contracted by about 1990 that what today is a scene of enormous activity will have sunk back into a tranquil archival library. By this time there might be two new decennial stores, 1970-80 and 1980-90, reaching saturation, which will have taken over the characteristic NLL function of rapid postal lending on a huge scale. And it will, of course, be far bigger than anything we have yet witnessed--several million loans per year. What then becomes of the original investment in conveyor systems and other equipment, when the demand for the pre-1970 literature in those stores is comparable to today's negligible demand for the science of the 1930's and 40's? Currently available data suggests that we should look at the matter from

another angle. There will, it seems, be a heavy increase in overall demand: if the rate of that increase remains more or less what it is at present (and it may well be higher) then the retrospective stores of the 60's, 70's and so on, instead of being dormant archival collections, will in fact be receiving some hundreds or even thousands of requests a day. Since this is what they are currently receiving, the conveyor systems will be needed indefinitely. This is already happening to C store, containing all the pre-1960 science; whilst its percentage of the NLL's total requests is falling, the actual demand on the store continues to increase, and it looks very much as if this phenomenon will occur with B store on a still larger scale. New and bigger equipment in new and bigger stores therefore appears inevitable, especially since most computer retrieval from magnetic tape files is likely to remain for some years the retrieval of citations, not documents.

Just before leaving the NLL, I learned from Dr. Barr that a major relocation of stock was being contemplated, namely the merging of A store back into the B/C store sequence. This particular experiment may be said to have been defeated by nothing more or less than the efficiency of the basic NLL retrieval system having exceeded expectations. The premise that a core collection of 1,200 heavily used titles would need to be separately maintained because it would require special techniques and a more favourable staff-to-stock ratio, was really invalidated by the adoption of A store methods for the other stores, in particular for B. And the very existence of a high priority collection committed the staff to a constant reviewing of individual periodicals, with frequent substitution of the entire run of a thriving title for one whose usefulness seemed to be waning: as a rule only one batch transfer of titles every two years has been possible. In the meantime, the chronological pattern of usage is seen to be as applicable to A store titles as to any others--issues less than five years old are in heavy demand: issues older than that are comparatively static. Therefore it is false economy to shelve the latter in A store, especially when there is perhaps a score of journals in B store currently experiencing a higher rate of usage than the bottom twenty A store titles. Given that the same tried and tested retrieval system is available in both locations, the library is thinking of simply abandoning the core concept and relying solely on the chronological principle.

The mere logistics of merging 1,200 of the NLL's major serials (and A store titles are often held in 4-6 copies) whilst continuing to run a loan service thereof, will itself need a year or two of planning. It might be plausibly argued that as the 1,200 titles of A store, only slightly mutated in almost ten years, still account for as many requests as the remaining 31,000 current and 34,000 dead titles combined, the experiment is far from having proven a failure. But originally, these 1,200 titles absorbed about 80% of the usage, and to accomplish that do-day would need the expansion of A store to over 3,000 titles. This would bring the core collection back to its original proportion of the total stock, but as we have seen, proportional usage is often no indication of actual usage. To maintain A store for another decade, let us say, would be to see this dichotomy become intolerable. Let us assume that a new decennial store, "G", is built to contain "lesser used" current literature as B store now does for the 1960's. Then first, the number of G store store titles that surpassed A store titles would increase well beyond the

present figure of about twenty; second, the extent by which they surpassed them would also increase; and third, for these reasons, the task of transferring sets of serials between A and G stores would involve such a volume of work as to render it counterproductive. In any event, the NLL is going to have to give some thought to the economics of storing 4-6 copies of the present A store titles indefinitely. The library has not yet been in business long enough to have any data on this, but it may well be that, even when they are past the 5-year half-life and have technically assumed archival status, these important publications will still be sufficiently in demand to warrant retaining two or three copies--but six is doubtful, and so the donation process of the NLL's early years may reverse itself and begin to flow from it to the nation's academic, special and public libraries.

That the NLL is excellently positioned both by being a library for science and by establishing from the first an ethos of experimentation, to benefit from advances in automation, will need no urging by now. MEDLARS was the first computerized retrieval system successfully to encompass an entire realm of science, and similar services are now becoming available for the chemical sciences and for engineering, under the auspices of the predominant English language reference serial in each area, Chemical Abstracts and The Engineering Index. Others will surely follow and we can look for the NLL to assume a leading role in their development in Britain. The NLL does not as yet possess its own computer--some studies were made a few years ago, which confirmed that for the present, the library's record-keeping would not be appreciably more efficient if done by a computer; and for MEDLARS the resources of Newcastle University are currently adequate. But they may not remain so, and as more and more public bibliographic information is stored magnetically on tape, disc or drum, there will presumably be a need for the library to acquire a machine. And it is not beyond imagining that, at about the time when the library's records could profitably be consulted on-line, and scores of the world's indexing and abstracting serials are available on tape, allied advances on another front--the use of the digital computer for automatic translation--will furnish a third compelling argument for installing one. Progress in this particular area is naturally watched with the utmost interest, in view of the library's nationwide responsibility.

Facsimile transmission is also under active discussion; feasibility studies have proved favourable, and two cooperating organizations have now been contracted to prepare a development project. The following summary of the position was given by Dr. Urquhart at the beginning of 1969:

> The unit cost of such a system is likely to be prohibitive, unless there is a sufficient volume of demand. Preliminary figures suggest that a minimum demand of . . . a quarter million pages per year would be necessary and this is appreciably greater than the present demand from any organization using the NLL. However, such a system might be economic for the supply of photocopies from the NLL to reference libraries in the centres of large conurbations. A more detailed study of this possibility would require more information than appears to be available at present about the use of large reference libraries.

> The sort of link visualised would include rapid arrangements for making and scanning microfilm at the transmission end and producing microfilm and enlargements at the receiving end. The supply time would depend mainly on the average head of work maintained at the transmitter. This would be influenced by the demand pattern and economic considerations. However, it looks as though a total supply time of less than one hour would be feasible.*

If, as seems probable, a viable system can be created between the NLL and the large metropolitan areas such as Greater London, the Leeds-Bradford conurbation or Manchester, then the snare which the NLL is again anxious to sidestep (as it successfully did with postal loans) is the "regional agent" concept, whereby all business transmitted to and from a given area has to be channelled through an intermediary agency which alone can deploy the necessary manpower and equipment. To accept that <u>modus operandi</u> would be merely to substitute electronic consoles for union catalogues as a filter. Hence the cautious reference by Urquhart to "more information . . . about the use of large reference libraries".

As regards coverage, the expansion into the social sciences has probably brought with it the prospect of future problems, as Dr. Urquhart admitted even when agreeing to the new service. Having so rapidly reached the science/social science boundary and crossed it, the library may have created similar problems of coverage at one remove, namely at the boundary between the social sciences and the humanities (which many fear will prove the more difficult of intellectual resolution because the library was given only a part of the new territory, the serials). Two examples: <u>Painting</u> as an industrial process has always been squarely within the library's purlieu; then material on oil-paintings and their restoration by chemical means was included; then the Fine Art market (as Economics). Now the NLL finds itself subscribing to <u>The Burlington Magazine</u>. Acceptance of straightforward archaeology, as part of social science with scientific associations (Carbon-14 dating, palaeozoology, etc.) means that material on the discovery of the Dead Sea scrolls can be allowed, together with standard historical and anthropological commentaries, including works concerned with comparative religion--whence it will be difficult to exclude scholarly Christian-historical treatment of the subject. The difference, and a palpably solid one, used to be between holding and not holding material pertaining to religion: now it is the much more fluid distinction between one aspect of religion, and another. The library may even have trouble with one particular author, if he is a Bertrand Russell.

To all this it can only be replied that if there are problems of coverage now, they are definitely no worse than they were before--for even if the suitability of specific classes of social science material at the NLL is still under discussion, they are at least broadly available through other libraries, so the dispute is academic. When the decision was made to include social science periodicals in a science and technology library,

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*"A Note to SCONUL from the NLL" February 1969 (unpublished) which Dr. Urquhart kindly made available.

it was made against an alarming background of widespread shortages of basic research information; a crisis situation reminiscent, to some, of the bad times of the early postwar period out of which the NLL had been born. If by taking this action the NLL has helped to draw the parameters of future discussion about the nature of the social sciences and their documentation, that is all to the good--but the first order of priority was to meet a national need for periodical literature on loan, which was nobody's forte so much as it was the NLL's. In fact, the decision to stock only the periodical literature may in time be seen as having minimised the short-term problems in the most rational way, by pragmatically erecting a simple form division before any nebulous questions of subject had to be resolved.

If it continues to be the case that, as Urquhart has recently been stressing,* NLL methods actually save far more per ton of literature for books than for periodicals, and if the recommendations of the Dainton Committee are carried through, then very big increases in the English-language book stocks can be expected. The initial experimental testing of a new approach to book storage and retrieval admittedly started slowly; and without negating the various logistical reasons offered for this (ibid) such as the sheer unavailability of many desiderata for the new library on the secondhand market or the difficulty of obtaining books in time for their period of maximum usefulness straight after publication, one might by looking at the larger picture fairly state that the NLL was quite simply so absorbed in its serials revolution that not much attention was paid to the books. Obviously no stigma attaches to this; in fact the library is to be commended for getting its priorities so unhesitatingly correct. Of late, however, expansion in this department has proceeded with more confident strides. There are reasons both internal and external for this.

Amongst the internal causes we can notice the evolving attitude of the NLL to book librarianship, and the realisation that books were even cheaper per ton than serials to process at the NLL. Furthermore, the library has always tended to solve its boundary problems of coverage by a policy of inclusiveness. With books as well as with serials it has met borderline cases, such as Desmond Morris' highly popular work on primate ethology, The Naked Ape, and David Kahn's masterly part-technical survey of the history of cryptology, The Code Breakers. As we saw, for periodicals covering social science, the matter was settled by a decision to include them as a whole: for books covering social science, the decision to exclude them as a whole effectively deferred the problem; but it has now reappeared, as exemplified by these two titles. Invoking its doctrine of inclusiveness, the library has of course purchased them. But deep alterations in the external climate have had a perceptible influence too. During the apocalyptic war years, publishing along with many other civilian occupations in Europe has suffered acutely where it had not gone under. Books of the cheapest possible paper were bound in the cheapest possible manner; Britain even issued hers with a special printed emblem on the title-page, to explain and apologise to future generations--although already, relatively few wartime books survive.

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*See for example his letter to Library World 70 #823 Jan. 1969, pp. 188-9.

By about the late 1950's however, when the postwar economic recovery of Europe was becoming self-sustaining, the book trade had grown back to health and was poised for a great leap forward, which came in the mid-sixties. Concurrently, the scientific revolution recorded in the phenomenal flood of serial publishing was throwing forth new technologies and new disciplines, which soon stood in need of the broad, synthesising treatise embodied in the scientific monograph, and of that unmistakeable attribute of scientific "arrival", the Annual Review. Companies like Pergamon Press and John Wiley & Sons have ridden to success a veritable boom in the publishing of good quality scientific and technical books.

All this has been reflected in the recent surge in the NLL's English-language book collections, demand upon which now considerably exceeds inter-library demand on any other book collection in the country. Now, for a cluster of reasons economic and bibliographic, the Dainton Committee has recommended that the stock of the National Central Library be transferred to Boston Spa; since it is proposed to include in this the huge union catalogue, however, Dr. Urquhart may well be disposed to say "Timeo Daintons et dona ferentes."

The Dainton Report also confirmed the wisdom of the decision to get out of London. Whilst users of the great London reference collections are overwhelmingly situated in the London area, the NLL's clientele is more evenly distributed around the country, with Scotland and Yorkshire, for example, making about equal use of the library. (op. cit. Appendix B-viii, Table 4) The report takes care to mention too (ibid p. 258) that "the library facilities in Central London have not made the NLL less necessary in these areas". The statistics indicate that the dense concentration of government, industry, learned societies, research organizations, colleges and universities in the capital still constitutes the single heaviest source of demand, with 38% of the national total.

It is at least arguable that the spectacular success of the NLL helped to accelerate the transformation of the Patent Office Library from a secluded collection of official records into a vigorous, outward-looking National Reference Library of Science and Invention. As we have seen, the two concepts had developed simultaneously, with the Reference Library idea taking an early lead; but the NRLSI had only been finally authorised in 1961, and did not therefore become fully operational until 1967. Its first Director, Miss Maysie Webb, has lucidly outlined the division of responsibility between the NLL and the new NRL.* Fundamentally, the NRL will try to complement the NLL's excellent service to organizations by offering a much better service than has been hitherto available, to the general public. The use of its resources (an initial collection of one million volumes) is personal and there is a minimum of formality - no ticket and no membership requirement: "readers just walk in and help themselves to as much as they want to consult" ("help themselves", that is, in the context of a reference library - and obviously there is

*"Library Logic", a contribution to Finding the Facts--A Special Report on Information Services. The Times (London) 19 December 1968.

reference assistance for those who are not so sure of the documents they will need). The NRL already subscribes to some 21,000 periodicals, and possesses a microform collection and reading facilities. As a counterpart to the NLL's formal translations programme from the Russian language, the NRL offers readers

> a free verbal interpretation service in German and Russian, which is intended to help them decide whether or not a full translation is needed. (loc. cit.)

--and the NRL too has begun to run "short courses on how best to exploit its resources." (loc. cit.)

Even though the NRL is located in London, the wider range of its public reference services will undoubtedly influence the NLL up in Yorkshire; in its lending operation, in its translating activities, probably in its Reading Room service, and perhaps even in its courses on literature-use. If, as is slowly beginning to appear, the subject departments of the nation's universities and colleges move towards accepting their obligation for the formal academic training of their science students in the structure and use of the literature, there will still be more than enough for the NLL to do in this direction. It might make a start upon in-service training for scientists and technologists in industry and government who missed such instruction at the outset of their careers, and now would still be grateful for it; some form of cooperation in this with the NRL might be explored to advantage. And there will always be practising librarians to whom a firsthand acquaintance with the NLL, even of two or three weeks duration, will be an enduring professional asset.

Regarding the NLL's contribution to the state of the library art as a whole, definitive assessment will of course only be possible after considerably more years have elapsed; for now, we will let Dr. Urquhart have a characteristically provocative last word:

> It is common to admit that the NLL's procedures are very suitable for its purpose, but that they would not suit other libraries . . . Only a few have begun to wonder whether the NLL's simple procedures could be applied to other types of libraries or whether, in fact, the NLL was a new species of library. This is, of course, not surprising. Probably very few dinosaurs wondered whether some of the strange new animals which began to appear were more suitable for the changing environment than they were.
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> ("A Model of Simplicity - Britain's National Lending Library for Science and Technology." - Library Journal, 90, p. 4926-28.)

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APPENDIX 1.

NATIONAL LENDING LIBRARY FOR
SCIENCE AND TECHNOLOGY
Walton, Boston Spa, Yorkshire LS23 7BQ
Telex: 55442
Telephone: Boston Spa 2031

Our reference: NLL/30
Your reference:

February, 1969.

Dear Borrower,

The users of the N.L.L. are making more and more use of it. In 1968 the library received over three-quarters of a million requests. In 1969 it is likely to receive about 900,000 requests. This rise in demand is welcomed by the staff. The library was created to be used.

There is one feature about the way the N.L.L. is used that I wonder about. 94 per cent of the United Kingdom requests we received in 1968 were for loans rather than photocopies. Why does the library not receive a higher percentage of requests for photocopies, particularly for small items of up to ten pages? A photocopy request for such an item only costs the user 4/- (returnable if the item is not supplied) whilst a loan request costs a borrower about 1/9 for each item borrowed. In addition, the borrower has to secure the return of the borrowed item from the actual reader, pack it up and pay the return postage. Sometimes, indeed, the borrower makes his own photocopy of the item borrowed. Surely judging by true costs, a photocopy request must often be cheaper to the borrower than a loan request.

Of course, to differentiate between loans and photocopies, a borrower must know how long an article is. However, 22 per cent of the loan requests the N.L.L. receives are for specific items in which the references (as given on the loan requests) indicate that the article is not more than ten pages long. Why, then, does the N.L.L. not receive more photocopy requests instead of loan requests?

Is the situation due to some lack of information or misunderstanding of the position? For example:

(a) Are borrowers adequately aware that the N.L.L. provides a photocopying service? This service depends upon the use of photocopy request forms. These cost £10 for 50. Each form is valid for a photocopy of an article of up to ten pages. The forms may be obtained from either the Science Museum Library or the N.L.L. and are valid in both libraries.

(b) Are borrowers operating without regard to true costs or is my estimate of the relative costs of loans and photocopies of small items wrong because of the way borrowers process photocopies? This could happen, for instance, if borrowers treat all photocopies as library acquisitions and catalogue them. Is such a procedure really justified in view of the cost of cataloguing and the low probability that the same small item will be required again?

(c) Is the quality and speed of the N.L.L. photocopying service inadequate? This is undoubtedly true for half-tones, but these are important in only a small percentage of articles. Some time ago the quality of the photocopying supplied and the speed of the service may have been unsatisfactory. The trouble then was that the N.L.L. relied upon a single large capacity machine which was sometimes in need of maintenance. The library is now equipped with photocopying machines in each of the four large stores. This has cut down both the handling labour and the processing time required. It has also provided sufficient machine capacity to eliminate low quality output or delays due to maintenance problems.

There are some possible reasons for the requests for loans instead of photocopies which seem to me to be legitimate:

(a) The part of a periodical which contain an article of interest to a borrower may contain other articles of interest.

(b) The periodical may contain some important half-tones which will not be reproduced adequately by Xerography.

(c) It is a nuisance in an organisation which only requires a small number of items per year from external sources (e.g. one which requests less than 200 items per year from the N.L.L.) to hold a stock of loan and of photocopy forms. (We are hoping to eliminate this trouble shortly.)*

But these reasons do not appear to be sufficient to account for the position. Are there other legitimate reasons I have not thought of? Perhaps you will tell me if there are?

I hope you will consider the contents of this letter carefully, for it seems to me that if borrowers made use of the N.L.L. photocopying service more often when they had a specific reference to an article of up to ten pages, this would:

1. Help to cut down borrowers' true costs,
2. Assist the N.L.L. to cut down its true net costs per issue,
3. Help to cut down the size of waiting lists.

Yours faithfully,

D. J. Urquhart.

D. J. URQUHART
Director

*P.S. The system proposed visualises a "loan/photocopy" form to which users will attach tokens if they specifically want photocopies. These new forms will be similar to the existing loan forms and will be available in pads and in "snap-apart" packs.

APPENDIX 2. (a)

Comparative costs of staff and acquisitions for Britain's national libraries.

Figures as given by the Dainton Report (s.v. the respective institutions) for 1967/68, in units of 1,000 pounds.

LIBRARY	STAFF	LITERATURE
British Museum	672	263 [1]
National Central	110	16 [2]
Science Museum	75	24
National Reference Lib. for Science and Invention	235	104
National Library of Scotland	164	28
Scottish Central Library	15	1.7 [2]
National Library of Wales	143	18
National Lending Library for Science and Technology	188	225

1. The BM's copyright privilege was estimated by the Report to be worth an additional 117,000 pounds in this year.

2. Includes binding costs.

APPENDIX 2. (b)

Two-year tabulation of NLL expenditures, in units of 1,000 pounds.

	1967/68 [1]	1968/69 [2]
Staff	188	225
Direct purchase of literature	225	259*
Literature purchased for exchange	9	12*
Binding	30	35
Russian Translating Service	175	208
Postage and misc. operating costs	42	70
Gross Total	669	809
Recovered from Russian Trans. Service	126	145*
Recovered from sale of loan forms	36	45*
Actual Total	507	619

1. Figures from the Dainton Report (op. cit. para. 102)

2. Figures from letter of D. J. Urquhart to Author.

*Author's extrapolation from figures in (2).

APPENDIX 3.

Cover-to-cover translations of Russian periodicals.

The following list was derived from the NLL brochure on the Russian Translating Programme, July 1967 version.

Russian Title	English Title	Date begun (Russian issue)	Agency
Zhurnal Fizicheskoi Khimii	Russian Journal of Physical Chemistry	July 1959	The Chemical Society, Burlington House, London W.1.
Zhurnal Neorganich-eskoi Khimii	Russian Journal of Inorganic Chemistry	Jan. 1959	do.
Uspekhi Khimii	Russian Chemical Reviews	Jan. 1960	do.
Avtomaticheskaya Svarka	Automatic Welding	Jan. 1959	British Welding Research Association, Abington Hall, Abington, Cambridge.
Svarochnoe Proizvodstvo	Welding Production	April 1959	do.
Stanki i Instrument	Machines and Tool-ing	Jan. 1959	Production Engineering Research Association, Melton Mowbray, Leicestershire.
Vestnik Mashinostroeniya	Russian Engineering Journal	April 1959	do.
Koks i Khimiya	Coke and Chemistry USSR	August 1959	Coal Tar Research Assoc., Oxford Road, Gomersal, near Leeds.
Liteinoe Proizvodstvo	Russian Castings Production	Jan. 1961	British Cast Iron Research Association, Bordesley Hall, Alvechurch, Birmingham.
Izv. Vuz. Tekhnolo-giya Tekstil'noi Promyshlennost'	Technology of the Textile Industry USSR	Jan-Feb. 1960	The Textile Institute, 10 Blackfriars Street, Manchester 3.
Stal'	Steel	Jan. 1959	Iron and Steel Institute, 4 Grosvenor Gardens, London S.W.1.

APPENDIX 3, (cont'd)

Russian Title	English Title	Date begun (Russian issue)	Agency
Kauchuk i Rezina	Soviet Rubber Technology	Jan. 1959	Maclaren & Sons, Ltd., P.O. Box 109, Davis House, 69-77 High Street, Croydon, Surrey.
Plasticheskie Massy	Soviet Plastics	July 1960	Rubber & Technical Press, Gaywood House, Great Peter Street, London S.W.1.
Priborostroenie	Instrument Construction	Jan. 1959	Taylor & Francis, Ltd., Red Lion Court, Fleet Street, London E.C.4.
Teploenergetika	Thermal Engineering	Jan. 1964	Pergamon Press, Ltd., Headington Hill Hall, Oxford.
Uspekhi Matematicheskikh Nauk	Russian Mathematical Surveys	Jan-Feb. 1960	MacMillan & Co. Ltd., 10-15 St. Martin's Street, London W.C.2.
Journals no longer published:			
Derevoobrabatyvayushchaya Promyshlennost'	Industrial Wood Processing	July 1959-Dec. 1960	Orders to: National Lending Library
Uspekhi Sovremennoi Biologii	Russian Review of Biology	July-Aug. 1959-Dec. 1960	Orders to: National Lending Library

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Notes: i) A list of the NLL's publications will be found in the text at pp. 71-2.

ii) Abbreviations:

J. Doc. - Journal of Documentation
L.A.R. - Library Association Record
Aslib Proc. - Proceedings of Aslib (Association of Special Libraries and Information Bureaux)

1. By D. J. Urquhart

"The distribution and use of scientific and technical literature" J. Doc. 3 (4) March 1948, pp. 222-31. Reprinted as Conference Paper no. 20 for the Royal Society Scientific Information Conference, 1948 (see next entry).

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"Public libraries and industry" Manchester Review 6, Autumn 1953, pp. 468-72.

"Facts and faith" J. Doc. 10 (3) Sept. 1954, pp. 123-6.

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"The use of scientific periodicals" International Conference on Scientific Information, Washington, D.C. National Academy of Sciences, 1958. Proceedings. pp. 287-300.

"A national loan policy for scientific serials" (with R. M. Bunn) J. Doc. 15 (1) March 1959, pp. 21-37.

"The United Kingdom National Lending Library for Science and Technology" UNESCO Bulletin for Libraries 13, Aug. 1959, pp. 173-5.

"Co-operation between the NLL and public libraries" L.A.R. 62 (2) Feb. 1960, pp. 50-2.

"The National Lending Library for Science and Technology" Library Association Conference, 1960, Proceedings. pp. 51-9.

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